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EC 92-1774-X

Trees of Nebraska

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by Michael Kuhns, Extension Forester
and David Mooter, Community Forester

Acknowledgments

The production of this book has been partially supported by funds from the Nebraska Forest Stewardship Program. Forest stewardship is woodland management that considers all appropriate land uses and outputs, including wood production, wildlife habitat, water quality, soil protection, and outdoor recreation. This book will advance the cause of forest stewardship by helping Nebraskans understand and care for their tree resources.

The authors would like to thank Kim Todd for her assistance on the table of landscape characteristics for selected trees. We also thank Tom Wardle for his thorough review of the text.

Most of the illustrations in this manual were originally drawn by Charles Herbert Otis and appeared in *Michigan Trees: A guide to the trees of Michigan and the Great Lakes region* by Burton V. Barnes and Warren H. Wagner, Jr., published in 1981 by the University of Michigan Press, which owns the copyrights.

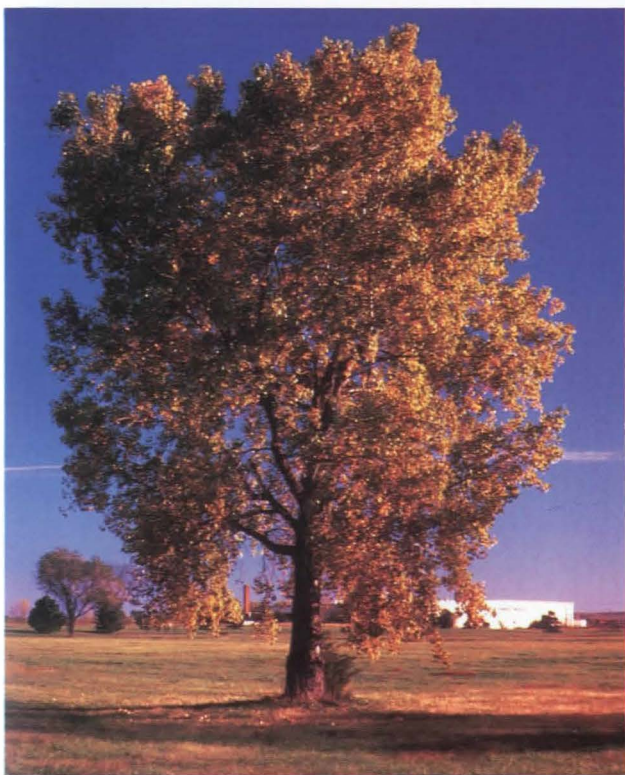
Other illustrations are by illustrator Renee Lanik or are from *Handbook of Nebraska Trees* by Raymond J. Poole, published in 1951 by the Conservation and Survey Division, Institute of Agriculture and Natural Resources, University of Nebraska-Lincoln, or from *North American Trees* by Richard J. Preston, published in 1948 by Iowa State College Press, Ames.

On the cover: The cover photo shows the beautiful white blossoms of the downy serviceberry (*Amelanchier arborea*), a small tree found occasionally in southeast Nebraska.

Black cherry fruit.



Ohio buckeye flowers.



Eastern cottonwood fall color.

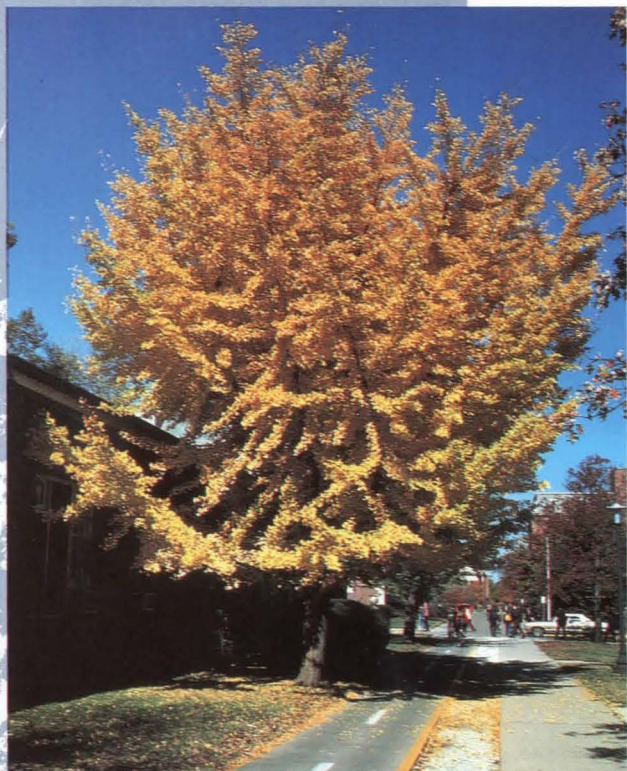


Redbuds in bloom.

Green ash fall color.



Orange bark on the trunk and upper branches of the Scotch pine.



Ginkgo fall color.



Blue green needles on Colorado blue spruce.

"Shaggy" river birch bark.



Catalpa blossoms.



Orange-red fruit on mountain-ash.



Goldenraintree in full bloom.

Mulberry fruit.



Pale green foliage of the Russian-olive.



Baldcypress fall color.



Thick scaled cones of the limber pine.

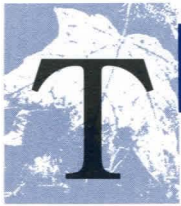
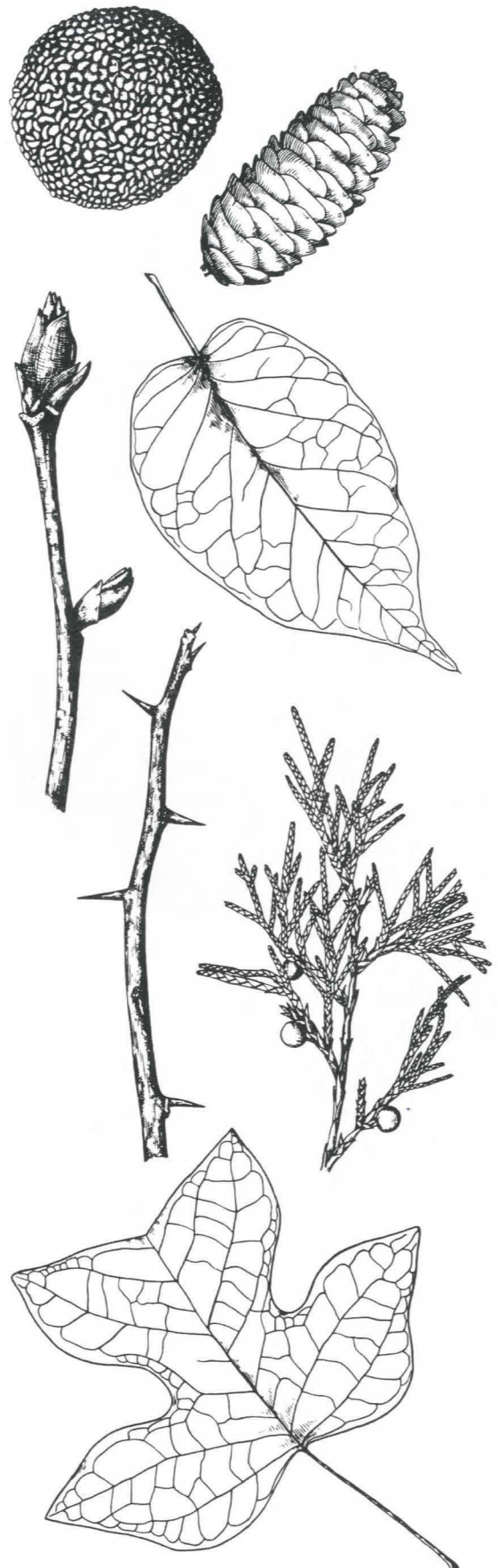
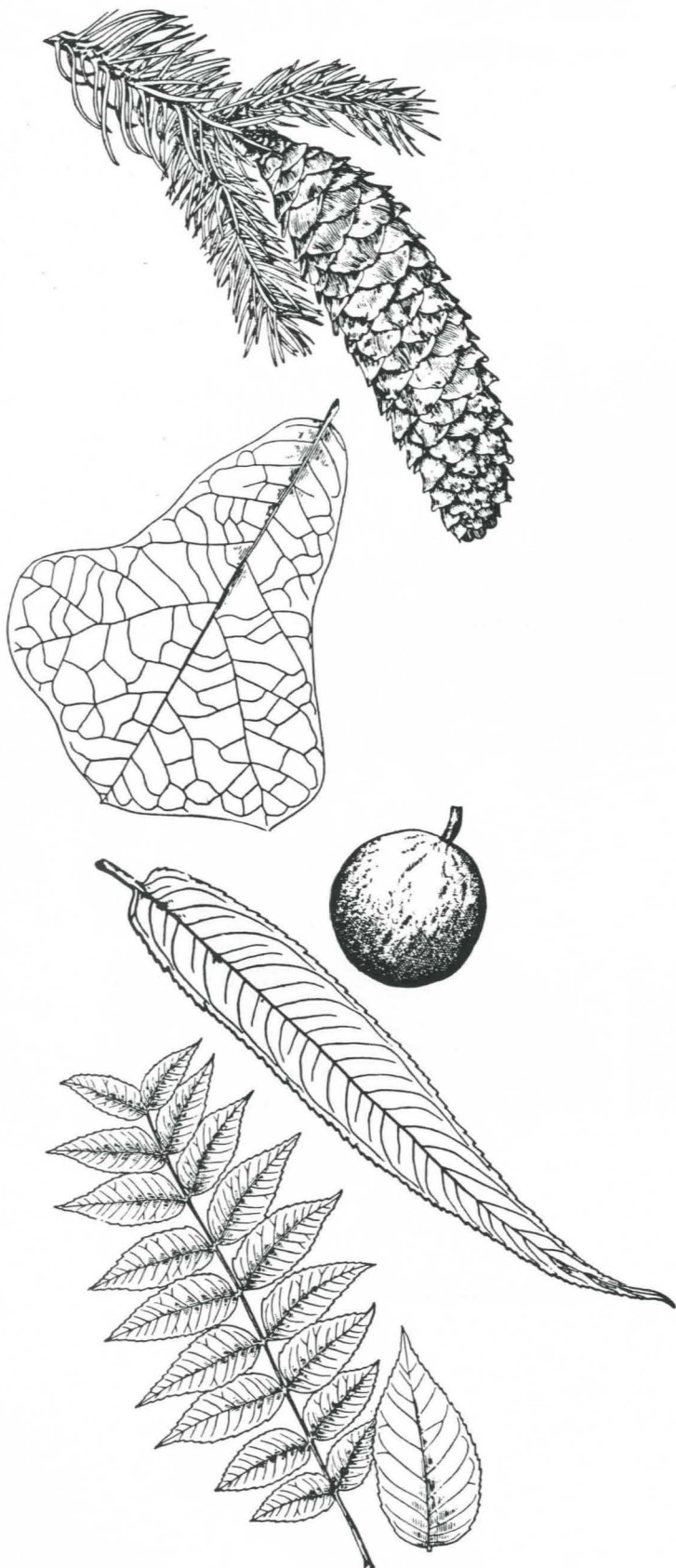


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Illustrations from Barnes and Wagner: Michigan Trees.



Introduction

Tree planting and care have been important to Nebraskans since the days of J. Sterling Morton. Our native and planted trees provide us with wind protection, shade, fruit, wood, and beauty. In order to know what trees to plant, and to properly manage existing trees, you need to know the conditions they require. Individual types of trees, or species, have differing needs for water, light, nutrients, and soil. But before you can select a tree that is well-suited to your site, you need to know how to tell one tree species from another.

This manual will show you how to identify 97 tree species by comparing leaves, twigs, fruit, bark, and other parts. You will learn how to look at and compare these parts and how to use a dichotomous key to identify species. Many of the species included in this manual are native to Nebraska, meaning they occur here naturally. Some are not native, but are commonly planted. A few are naturalized; they are not native but have escaped cultivation and are growing in the wild.



ree Parts

LEAVES

Shade Tolerance: Some tree species are more efficient at making food through photosynthesis with low light. These are called *shade tolerant*. Examples are basswood, hackberry, sugar maple, and eastern redbud. *Shade intolerant* species include cottonwoods, willows, birches, and pines. Shade intolerant species generally appear early in the life of a forest and grow quickly in height, while tolerant species seed in later under the shade of the intolerant species.

Persistent or deciduous: A tree's leaves either remain on (and green) through the winter (*persistent* or *evergreen*) or die and fall off in autumn (*deciduous*). Most broadleaves found in northern climates, like Nebraska's, are deciduous. Most conifers have persistent or evergreen leaves. Sometimes a tree's leaves will die in autumn but will remain on the branch through most of the winter. An example of this is pin oak.

Leaf type: There are several types of tree leaves, but they all fit into four general categories: *needle-like*, *scale-like*, *awl-like*, and *broadleaf*. Broadleaves are common on hardwoods or angiosperms, though one gymnosperm we will cover, ginkgo, has broad, flat-bladed leaves. Though the name broadleaf implies a wide leaf, these trees actually have leaves ranging from very wide (sycamore) to very narrow (willow).

Needle-like leaves are found on most conifers, or gymnosperms, other than the cypress family. Pine needles are always held in bunches of two to five. *Hard pines* have needles in bunches of two to three with a scaly sheath around the base. *Soft* or *white pines* always have five needles in a bunch without a scaly sheath.

Spruces, true firs, Douglas-fir, and many other conifers have single needles. They may be flat (fir or Douglas-fir) or diamond-shaped (spruce) in cross-section.

Scale- or awl-like leaves are both found on junipers or redcedars. Younger twigs generally have scale-like leaves while older twigs and branches have awl-like leaves. Both awl- and scale-like leaves cover the twig surface completely.

Leaf Types BROADLEAVES



Oak leaf
(simple)



Tree-of-heaven
leaf
(compound)

Willow
leaf
(simple)

NEEDLE-LIKE, with cross-sections



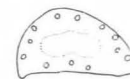
Soft Pine
Needles



cross-section
of leaves



Hard Pine
Needles



cross-section
of leaf



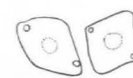
Fir Needle



cross-section
of leaf



Spruce
Needles



cross-section
of leaves

SCALE-LIKE, AWL-LIKE

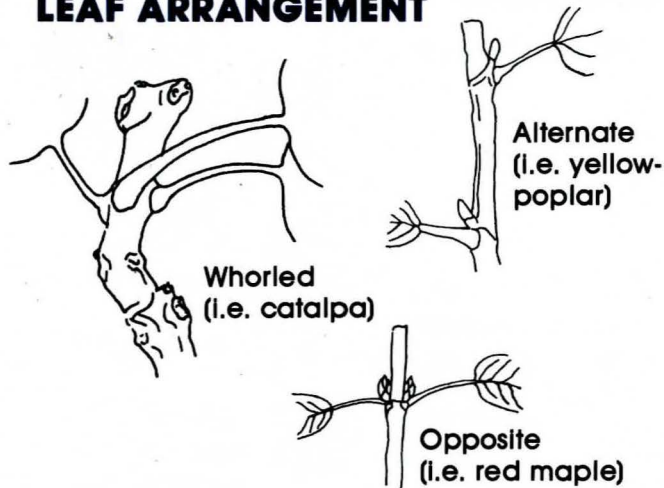


Scale-like leaves

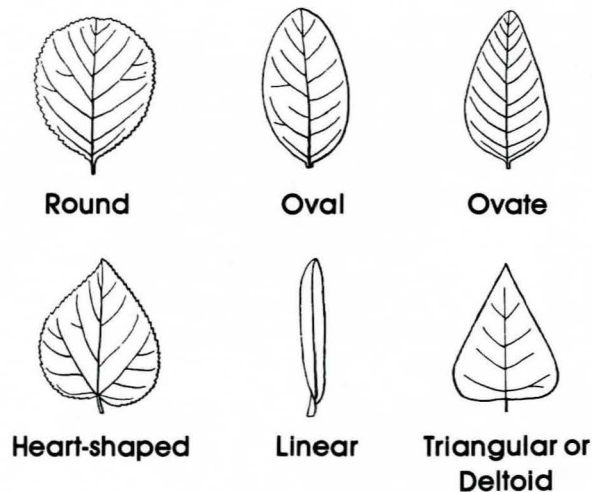


Awl-shaped leaves

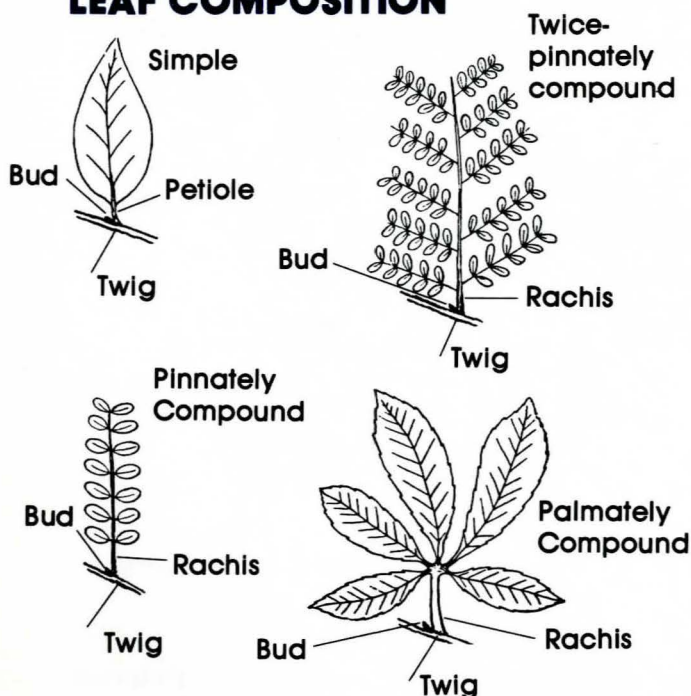
LEAF ARRANGEMENT



LEAF SHAPE



LEAF COMPOSITION



Leaf arrangement: Conifer leaves are arranged either *spirally* or *opposite* each other on a twig. Broadleaves are arranged either *opposite* each other on a twig (two at each *node* or point of attachment), *alternate* (one at each node), or *whorled* (more than two leaves at each node, usually three). Most broadleaved tree species have alternate leaves. One way to remember many of the species with opposite leaves is to remember "**MAD Buck**". This stands for Maple, Ash, Dogwood, and the Buckeye (horsechestnut) family, all of which have opposite leaves.

When the leaves are on the tree, you can determine leaf arrangement by following the leaf stalk or *petiole* back to where it is attached to the twig. There will be a bud at this point on all but new growth, though the bud may sometimes be hidden under the base of the petiole. If leaves have fallen off, look at the arrangement of leaf scars and buds on the stem.

Leaf shape: Leaf shape or outline is sometimes a good indicator of a species. It can be variable though, depending on leaf development, shade, and genetic variation.

Leaf composition: Broadleaves are classified as *simple* or *compound*. Simple leaves have one blade attached to a petiole or stalk. Compound leaves have a few to many leaflets or small leaf blades attached to a stalk or stalks. The central stalk attached to the twig in a compound leaf is called a *rachis*. Compound leaves are either *palmately compound*, *pinnately compound*, or *twice-pinnately compound*.

You can tell leaflets of compound leaves from simple leaves by looking at the point where they attach to the stalk or stem. If a bud is found, you have a whole leaf; if there is no bud, you have a leaflet. You also can look at which part of the leaf falls off in autumn (look on the ground under the tree at other times of year). While entire leaves generally come off the tree in fall, the stalks of some compound leaves, like black walnut, may not fall until mid or late winter.

Leaf margins: Margins or edges of leaves are either *entire* or smooth, lobed, or toothed. Toothed leaves, sometimes called *serrate*, can be coarsely or finely serrate, singly or doubly serrate (teeth on teeth), and can have sharp (pointed or angled) or blunt (rounded) teeth.

Leaf tips and bases: The shapes of leaf tips and bases are very useful characteristics. Several examples are shown below.

Leaf surfaces: Leaf surfaces can be lightly or densely hairy (*pubescent*), rough, smooth, shiny, scaly, or waxy. Top surfaces often are different from bottom surfaces.

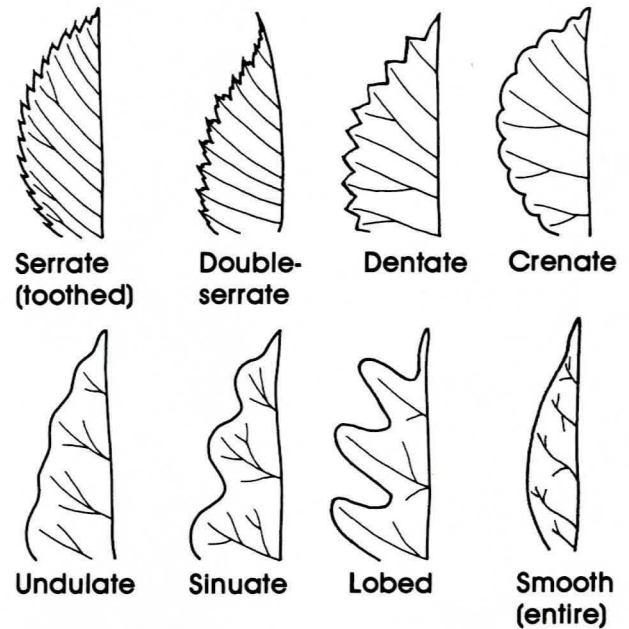
TWIGS

Twigs, the smallest branches of a tree, can be rough, smooth, hairy, shiny, ridged, straight, zig-zag, or waxy. *Pith*, or the tissue in the middle of a twig, may be chambered or solid and variously colored.

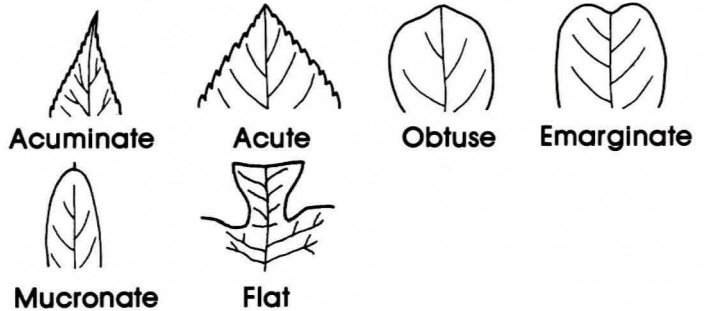
BUDS

Buds hold the small leaves and twigs that will grow the next year. There are also flower buds, but we will not discuss them here. Buds can be *terminal* (at the twig tip) or *lateral* (on the side of the twig). Some twigs do not have a terminal bud, instead they have one located at the tip but off to one side. Oaks have several buds clustered around the twig tip. Some lateral buds may be hidden under the base of the petiole, as in sycamore.

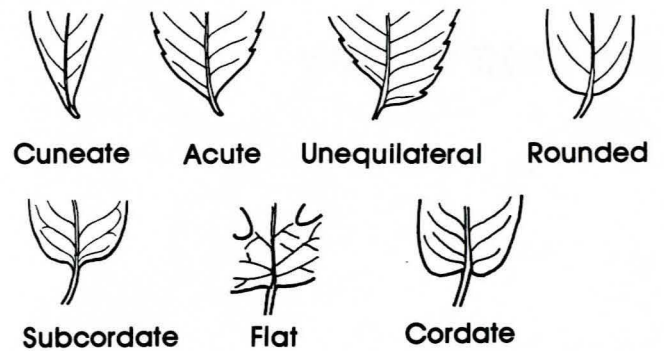
LEAF MARGINS



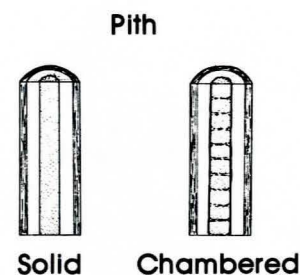
LEAF TIPS



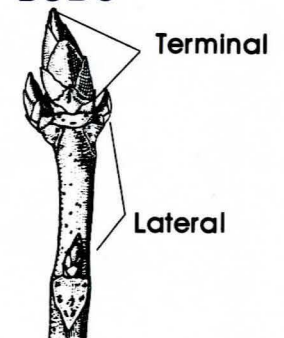
LEAF BASES



TWIGS



BUDS





FLOWERS

Flowers are the reproductive parts of a plant. In many woody plants flowers are small and inconspicuous and may not be present for much of the year. Some vegetatively propagated varieties also may not bear flowers and fruit. The usefulness of flowers for identification of trees is therefore limited. However, plants are ultimately classified by flower structure and some species do have conspicuous flowers, so some knowledge of flowers is useful.

In this book we will only deal with the sexual characteristics of flowers found on trees. In addition, floral descriptions are included under the species descriptions for a few species with unique or showy flowers. For a more complete description of flower parts and arrangement see one of the references listed on page 18.

Flowers that have actively functioning organs of both sexes (*stamens* and *pistils*) are *bisexual* and are called *perfect flowers*. Perfect flowers are typical of the elm, magnolia, rose, linden, and several other families. If a flower lacks either functioning stamens or pistils it is *imperfect* or *unisexual*. Unisexual flowers can be either *staminate* (male) or *pistillate* (female). When a species has only unisexual flowers, and both staminate and pistillate flowers are found on the same tree, that species is called *monoecious* (for the Greek "one house"). Monoecious families include pine, walnut, birch, oak, and others. *Dioecious* ("two houses") species have staminate flowers on one tree and pistillate flowers on a separate tree, as in the willow and mulberry families. If both perfect and imperfect flowers are found on the same tree, the species is called *polygamous*. *Polygamo-dioecious* species have unisexual flowers, with staminate and pistillate flowers borne on different trees, but also have some perfect flowers on each tree. Examples are honeylocust, Kentucky coffeetree, and persimmon. *Polygamo-monoecious* species have staminate and pistillate flowers borne on the same tree, along with some perfect flowers on each tree, as in hackberry.

Knowing these floral characteristics is useful from an identification and tree selection standpoint. With this information, you will know whether a species has male-only trees and female-only trees and whether all trees will bear fruit (only trees with female or perfect flowers can bear fruit).

FRUITS

Fruits develop from flowers with female parts and are the seed-bearing organs of a plant. They can be very helpful for tree identification. Several fruit types and examples are:

1. *drupe* — fleshy with a single stone or pit (example- cherry).
2. *berry* — fleshy with several seeds (example- persimmon).
3. *pome* — fleshy outer coat and stony layer (similar to plastic) and several seeds within (example- apple, pear).
4. *legume* — dry, elongated pod that splits in two with several seeds along one edge (example- honeylocust, redbud).
5. *capsule* — dry fruit that splits to reveal many seeds inside (example- catalpa).
6. *achene* — small, dry, and hard one-seeded fruit (example- a sycamore "fruit" is actually hundreds of achenes).
7. *samara* — one or two flat wings attached to a seed (example- maple, elm, ash).
8. *nut* — hard, with an outer husk that does not split open readily and an inner papery to woody shell (example- black walnut).
9. *acorn* — nut-like fruit of an oak, with a scaly or warty cap.

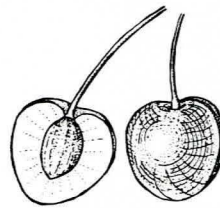
BARK

Bark is the outer covering on the trunk, twigs, and roots of a tree. The outer part of the bark is dead. New bark is constantly being made on the inside and pushed out. This is why older trunks usually have rough outer bark that peels or flakes away. Bark is highly variable, though young trees of most species have fairly smooth bark. To see what a tree's bark looked like when it was young, look at the young bark on upper branches and twigs. Some tree species, like sycamore, white poplar, and Scotch pine, can be easily identified by bark characteristics.

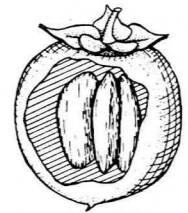
The inner bark, or *phloem*, is a live spongy tissue that moves food throughout the tree. It eventually grows out and dies to form part of the outer bark. Just inside the inner bark, but outside the wood, is a single layer of cells called the *cambium*. This layer divides and forms layers of cells to the inside that become wood and to the outside that become phloem and bark.

WOOD

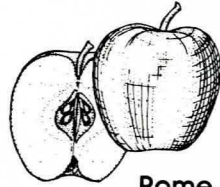
The wood is everything inside the cambium on tree trunks, branches, twigs, and roots. Wood can also be called *xylem*. Wood is made up of fibers for strength and hollow tubes of different sizes and types. These tubes, like straws, conduct water from the roots to the leaves. Most of the larger tubes are called *vessels* and look like pores in cut wood. Smaller tubes are called *tracheids* and are too small to be seen without a magnifier.



Drupe
(cherry)



Berry
(persimmon)



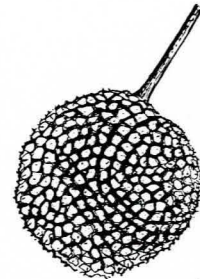
Pome
(apple)



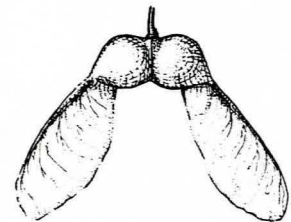
Legume
(eastern redbud)



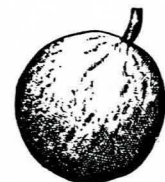
Capsule
(catalpa)



Achene
(American sycamore)



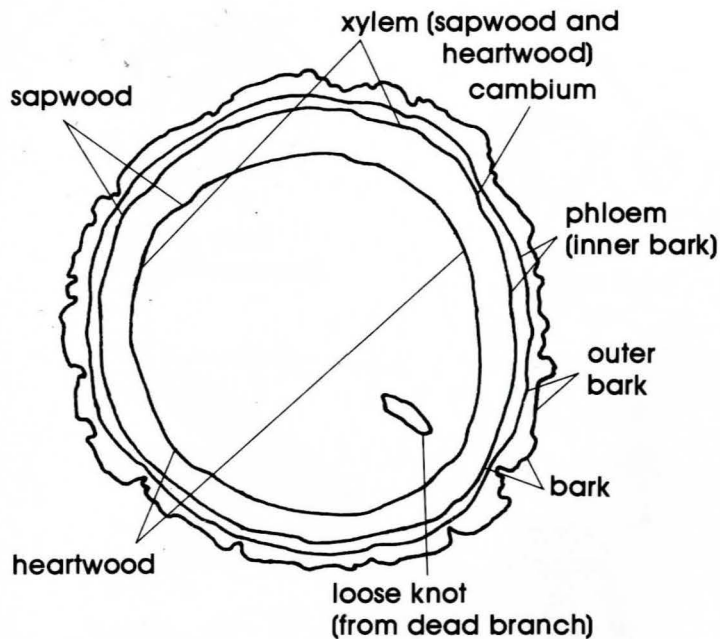
Samara
(maple)



Nut
(black walnut)



Acorn
(oak)



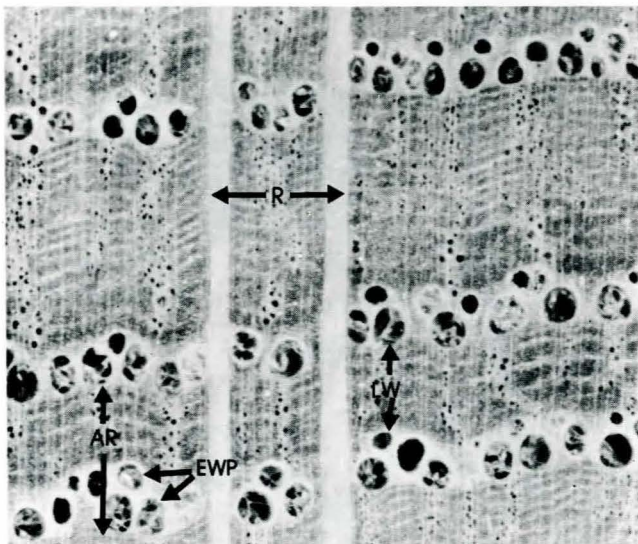
Softwoods and hardwoods: Trees can be divided into two general classes called *softwoods* and *hardwoods*. Softwood is another name for a *conifer* or cone-bearing tree like a pine, spruce, or fir. The wood of many of these trees is fairly soft and light. They sometimes are called *non-porous* because they have no large vessels, only very small tubes or tracheids that cannot be seen easily. Hardwoods also are called *broadleaves* and include trees such as elm, ash, oak, and cottonwood. They are often called *porous* woods because their wood is mostly made up of small to large vessels that appear as pores or holes in a cross-section. Some woods classified as hardwoods, such as cottonwood, actually have softer wood than a true softwood, such as Douglas-fir.

Annual rings: As trees grow, a new layer of wood is produced each year. This layer is called an *annual ring* or *growth ring*. The inner part of an annual ring (on the inside of the curve) is formed early in the year and is called *spring-wood*. Spring-wood generally has larger vessels or pores with thinner walls and may be lighter in color. *Summer-wood*, on the outside of an annual ring, has smaller pores or vessels packed closer together with thicker walls and may be darker in color.

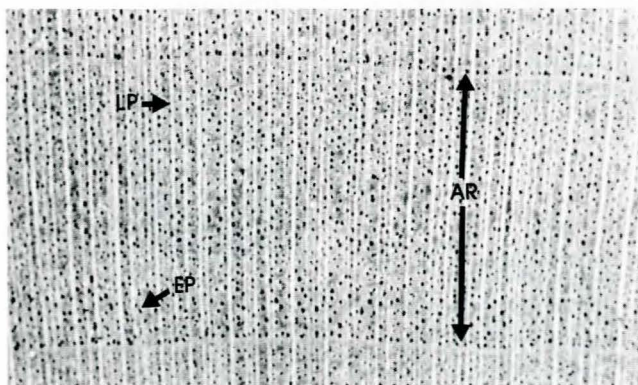
Sapwood and heartwood: Each year as a new annual ring is added by the cambium to the outside of a tree's stem, some of the wood in the middle of the tree dies and becomes *heartwood*. Heartwood often is filled with dark colored substances that help it resist decay. The active living wood on the outside of the stem, one to many rings wide, is called the *sapwood*. It is usually lighter in color than the heartwood. The sapwood is responsible for water movement through the stem.

Rays: Rays are ribbon-like groups of vessels, tracheids, and fibers that move water and other substances in the xylem from the outer rings in or from the inner rings out. They also connect with the phloem. Rays may be large and easily seen, as in the oaks, or small and hard to see, as in cottonwood. They show up best and largest in cross-sections and surfaces cut lengthwise through the middle of the trunk.

Ring-porous and diffuse porous: Wood of broadleaved trees can be classified as *ring-porous*, *diffuse-porous*, or *semi-ring-porous*. Ring-porous wood has vessels or pores in the spring-wood much larger than in the summer-wood. Examples are oak, ash, and elm. Diffuse-porous wood has spring- and summer-wood vessels very similar in size, as in cottonwood and willow. Semi-ring-porous is somewhere between ring-porous and diffuse-porous, as in black walnut or black cherry.



Cross-section of a ring porous hardwood (oak). Large earlywood pores, EWP; latewood, LW, with small pores composing one annual ring, AR. Large rays, R. (About 10x magnification).



Cross-section of a diffuse porous hardwood (maple) with no difference in earlywood and latewood pores, EP, LP. Annual rings, AR, not as distinct as in ring porous wood. (About 10x magnification).



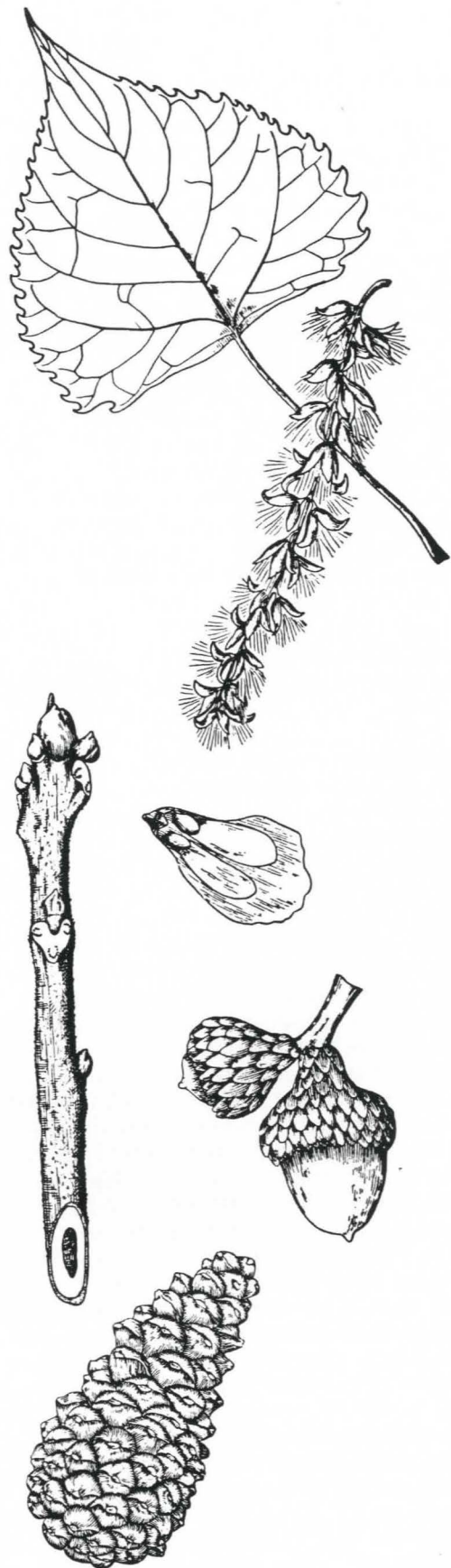
Species List

A particular type of tree is called a *species*. Though the word species ends in an "s", it is used to describe one or many types of trees (singular or plural). Trees of the same species are very alike in fruit, flowers, and other parts. We know most trees by their *common names*, such as "white poplar" or "cottonwood". These names are useful, but the same species may have more than one common name, depending on local custom. For example, white poplar is also called silver poplar and sometimes even silver maple. Osage-orange is also called hedge and bodark. Ironwood is a common name used for eastern hophornbeam, American hornbeam, and several other species with very hard wood.

Because of all the local variation in tree names, standard names have been established. These names, also called *scientific names* or Latin names because they use Latin words, are used world-wide to describe a certain species. The Latin name for northern red oak is *Quercus rubra*. Latin names are always underlined or set in italics to set them apart. The first word, in this case *Quercus*, is the *genus* (plural is *genera*) of the tree. A genus is a broad group of species that are alike in some ways but not enough to be in the same species. The genus *Quercus* includes all the oaks, and *Ulmus* all the elms. The second word in the scientific name is the *species name*, in this case *rubra*. So when you see the name *Quercus rubra*, you know it refers to a northern red oak, no matter who is using it or where they are from.

Another name you will see used in this book is the *family name*. A family is a group of genera that are closely related. The first part of the family name comes from the most common or typical genus in that family. Family names always end in "*aceae*", pronounced "ay-cee-ee". An example of a family is the Ulmaceae, which includes the elms (*Ulmus* genus), hackberries (*Celtis* genus), and others.

The following is a list of the 97 tree species described in this manual. This list does not include every tree found in Nebraska, but it does include most native and many introduced species. Several species are mentioned within the description of another species, but are not illustrated or fully described because of their minor importance. One or two common names and the scientific name for each species is given. The species are listed in order of their appearance in the manual, with the page number of their description on the right.



Illustrations from Barnes and Wagner: Michigan Trees.

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Tree Identification Key

A *dichotomous key*, or two-branched key, can help you quickly identify trees in the field. The dichotomous key here includes the 97 species described in this manual. To use a dichotomous key, first go to the line with the lowest letter or number, in this case an A or 1. There will always be two lines with the same letter or number indented the same. Read the descriptions on those two lines and decide which description fits your tree best. Then go to the next number listed right below the description you chose. Again, you will have to choose between two descriptions with the same number. At each step you only need to make one or two fairly simple decisions. Keep doing this until you reach the common name of your tree. Then look at the species description for that tree and see if it matches.

An example will help you learn how to use the key. Let's say you have a large tree with simple, opposite, broad, palmately-lobed leaves, a winged fruit, and twigs with a strong smell when crushed. First go to the overall key with letters and you will see that you want Key 2 for simple, opposite, broad leaves. In Key 2, the first choice (1) is "leaves palmately lobed and fruit a samara" versus "leaves not lobed". Your leaves are lobed and your fruit is a samara so you go with the first choice. Now you go to number 2, "leaves with sharply and often doubly toothed margins and sharp-angled sinuses" or "lobes of leaves entire or with a few blunt teeth and more rounded sinuses". Again you take the first choice. You now go on to 3, "leaves with middle lobe much longer than side lobes; shrub or small tree when mature" versus "leaves with middle lobe equal to, or only slightly longer than, side lobes; full-sized trees when mature". Your leaves don't have a middle lobe that is much longer than the side lobes, and your tree is full-sized, so you take the second choice and go on to 4 (your tree is not an Amur maple). Under 4 you notice that only one choice mentions a strong smell for crushed twigs so you know that your tree is a silver maple.

This key does not include every tree you might find, so you may be fooled into thinking you have something you do not. It is also easy to make a mistake if you make the wrong decision or if the sample you have is not typical of the species overall. Just remember to check your identification against the species descriptions and with other references if you have them. Listed on the left are some good references to look for in a bookstore or library.

Dirr, Michael A. 1990. *Manual of woody landscape plants: their identification, characteristics, culture, propagation and uses*. Stipes Publ. Co., Champaign, IL. 826 pp.

Elias, T.S. 1980. *The complete guide to North American trees*. Von Nostrand Reinhold Co., NY. 948 pp.

Harlow, William H. 1941. *Fruit key and twig key to trees and shrubs*. Dover Publ., Inc., NY. 56 pp.

Muenschler, Walter C. 1950. *Keys to woody plants*. Comstock Publ., Inc., Ithaca, NY. 108 pp.

Preston, Richard J. 1989. *North American trees*. Iowa St. Univ. Press, Ames, IA. 407 pp.

Preston, Richard J., and Valerie G. Wright. 1982. *Identification of southeastern trees in winter*. North Carolina Ag. Extension Service, Raleigh, NC. 113 pp.

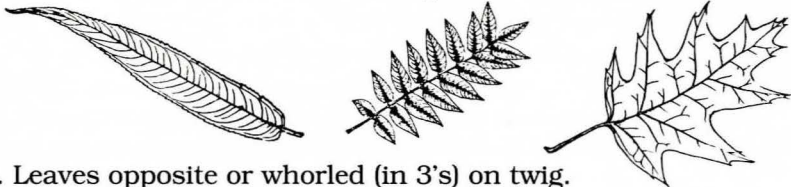
This key works best in summer with leaves on, but may work fine in other seasons if you can find old leaves and fruit on the ground, and if you use leaf scars as signs of leaf arrangement.

SUMMER KEY TO NEBRASKA'S TREES

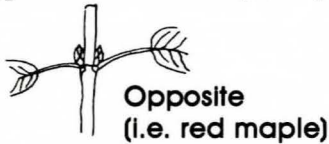
A. Leaves needle-like, scale-like, or awl-shaped; usually evergreen.**Key 1** p. 20



A. Leaves broad and thin; deciduous (not persistent over winter).



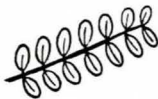
B. Leaves opposite or whorled (in 3's) on twig.



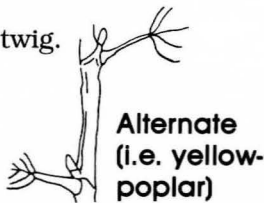
C. Leaves simple.**Key 2** p. 21



C. Leaves compound.**Key 3** p. 21



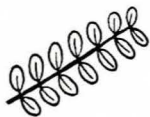
B. Leaves alternate on twig.



D. Leaves simple.**Key 4** p. 22



D. Leaves compound.**Key 5** p. 25



Key 1. Plants with needle-like, scale-like, or awl-shaped leaves.

(Gymnosperms except ginkgo)

1. Leaves needle-like; fruit a cone.
 2. Needles occur in clusters of 2-5 (**pin**es).
 3. Needles in clusters of 5; cones cylindrical, their scales thin (**soft** or **white** **pin**es).
 4. Needles 1.5" to 3" long, stout, rigid; young branches flexible; usually found only in w. Nebraska. **limber pine** p. 28
 4. Needles 3" to 5" long, flexible, slender; usually found in e. Nebraska. **eastern white pine** p. 28
 3. Needles occur in clusters of 2-3; cone scales thick, often armed with spines (**hard** **pin**es).
 5. Needles 2 and 3 in a cluster, 5" to 10" long; cone scales armed with spines; buds red. **ponderosa pine** p. 27
 5. Needles mostly 2 in a cluster, usually 6" long or less.
 6. Needles 4" to 6" long, stout, stiff; bark of trunk gray-brown with black furrows; bud silvery. **Austrian pine** p. 27
 6. Needles 3/4" to 4" long.
 7. Needles 3/4" to 1.5" long, yellow-green, widely spread in cluster; cones often remain closed. **jack pine** p. 28
 7. Needles 1.5" to 4" long, blue-green to yellow-green, twisted; bark on upper trunk orange-red. **Scotch pine** p. 27
 2. Needles occur singly, or needles in clusters of many (10 to 40) on spur shoots on older twigs.
 8. Needles occur singly, evergreen or deciduous.
 9. Finest twigs very slender, greenish, mostly deciduous; needles deciduous, yellow-green, flattened, two-ranked; cones 3/4" to 1" diameter, round, with several woody scales; bark fibrous; base of trunk often flared. **baldcypress** p. 34
 9. Needles and twigs not deciduous; needles not yellow-green; bark not fibrous.
 10. Needles flat in cross-section, tips rounded or occasionally pointed.
 11. Needles stalked, 3/4" to 1-1/4" long; small branches roughened by old needle bases; cones 3" to 4" long, hang down, with 3-pointed, fork-like bract sticking out of each scale. **Douglas-fir** p. 31
 11. Needles not stalked; small branches glabrous; cones upright with deciduous scales (**true** **firs**).
 12. Needles 2" to 3" long, silver-blue to silver-green. **white fir** p. 30
 12. Needles 3/4" to 1-1/2" long, dark green above with 2 silvery bands below. **balsam fir** p. 31
 10. Needles 4-sided, square or diamond-shaped in cross-section, tips sharply pointed (**spruces**).
 13. Cones 4" to 8" long; needles with slight odor when crushed; twigs may droop up to several feet on older trees. **Norway spruce** p. 30
 13. Cones 1" to 4" long; branches do not droop; needles with pungent odor when crushed.
 14. Cones 2" to 4" long, scales with serrate margins. **blue spruce** p. 29
 14. Cones 1" to 2-1/2" long, scales rounded and entire. **white spruce** p. 30
 8. Needles on first-year twigs occur singly, on older twigs in clusters of many on spur shoots, deciduous (**larches**).
 15. Cones 1/2" to 3/4" long, with 12 to 15 scales. **tamarack** p. 29
 15. Cones 3/4" to 1-1/2" long, with 40 to 50 scales. **European larch** p. 29
 1. Leaves scale-like or awl-shaped, often of 2 kinds; fruit berry-like or a small cone.
 16. Fruit berry-like; leaves usually scale-like and awl-shaped on the same tree (**junipers**).
 17. Leaves dark green to purple-green; fruit small, berry like, pale green to dark blue, matures in one season; native to eastern 2/3's of Nebraska. **eastern redcedar** p. 32
 17. Leaves green to light blue-green; fruit as above but maturing in two seasons; native to western 1/3 of Nebraska. **Rocky Mountain juniper** p. 32
 16. Fruit a small cone; leaves scale-like (**arborvitae**s or **white-cedars**).
 18. Twigs arranged in horizontally flattened or drooping sprays; cone 1/3" to 1/2" long. **northern white-cedar** p. 33
 18. Twigs arranged in vertically flattened sprays; cone 1/3" to 1" long. **Oriental arborvitae** p. 33

Key 2. Plants with opposite or whorled, simple (not compound), broad leaves.

1. Leaves palmately lobed; fruit a samara (**maples**).
 2. Leaves with sharply and often doubly toothed margins and sharp-angled sinuses (**soft maples**).
 3. Leaves with middle lobe much longer than side lobes; shrub or small tree when mature. **Amur maple** p. 64
 3. Leaves with middle lobe equal to, or only slightly longer than, side lobes; full sized trees when mature.
 4. Leaves usually 4" across or less, mostly 3-lobed; samara about 3/4" long; twigs with no strong smell when bruised; not native to Nebraska. **red maple** p. 64
 4. Leaves usually 6" to 7" across, mostly 5-lobed; samara about 1-1/2" long; twigs with strong smell when bruised; native to Nebraska. **silver maple** p. 63
 2. Lobes of leaves entire or with a few blunt teeth and more rounded sinuses (**hard maples**).
 5. Sap from broken petioles milky (may not show if very dry); buds green or red, stout and blunt. ... **Norway maple** p. 63
 5. Sap from broken petioles not milky; buds brown, slender and pointed. **sugar maple** p. 64
1. Leaves not lobed.
 6. Leaf blades 8" to 15" long, with long tapering tip, heart-shaped, usually in whorls of 3; fruit a slender capsule, 8" to 20" long. **northern catalpa** p. 70
 6. Leaf blades less than 8" long, not heart shaped, fruit not as above.
 7. Twigs slender, terminal bud present; flower buds look like small lanterns or urns on branch tips; fruit a bright red drupe; showy white or pink flowers that appear in early spring before leaves. **flowering dogwood** p. 68
 7. Twigs stout, often with no terminal bud; flower buds not as above; fruit a 3/4" long, curved, brown capsule; flowers showy and white, held in 6" to 12" long groups, appear in June. **Japanese tree lilac** p. 70

Key 3. Plants with opposite, compound leaves.

1. Leaves palmately compound; fruit a 3-part capsule with shiny, nut-like seeds.
 2. Leaflets usually 7; buds gummy. **horsechestnut** p. 65
 2. Leaflets usually 5; buds not gummy; injured twigs with strong, unpleasant odor. **Ohio buckeye** p. 65
1. Leaves pinnately compound; fruit a drupe or a samara.
 3. No terminal bud; lateral buds hidden by base of rachis when leaves are attached; fruit a drupe (on female trees). **Amur corktree** p. 61
 3. Terminal bud present; lateral buds not hidden by base of rachis; fruit a samara.
 4. Leaflets mostly 3 to 5; fruit a 2-winged samara. **boxelder** p. 62
 4. Leaflets mostly 5 to 9, fruit a 1-winged samara (**ashes**).
 5. Upper edge of leaf scars deeply notched under lateral bud; twigs glabrous and glossy; purple fall leaf color; uncommon. **white ash** p. 69
 5. Upper edge of leaf scars curved or straight-across under lateral bud; twigs velvety near tip; yellow fall leaf color; common. **green ash** p. 69

Key 4. Plants with alternate, simple leaves.

(Sometimes some leaves are clustered on short spurs.)

1. Leaves lobed.
 2. Leaves fan-shaped with parallel-branched veins running to margin, mostly on short, spur-like branches, usually 2 blunt lobes on outer end of leaf. **ginkgo** p. 34
 2. Leaves and veins not as above.
 3. Leaves distinctly palmately lobed and veined.
 4. Leaves distinctly star-shaped, 5-7 lobed, evenly and finely toothed; fruit a spherical head of capsules with a long stalk; twigs often with corky ridges. **sweetgum** p. 53
 4. Leaves not distinctly star-shaped, 3-5 lobed, unevenly and coarsely toothed; fruit not as above; twigs without corky ridges.
 5. Petiole base hollow and covering lateral bud; mature leaves hairy only along veins underneath, 4" to 9" wide (sometimes wider); bark of trunk and branches rough, smooth or peeling off in large plates all on the same tree; fruit a dry ball of hairy achenes, hanging on a long stalk. **American sycamore** p. 54
 5. Base of petiole not hollow and not covering lateral bud; mature leaves dark green above, covered with fine white hairs underneath, less than 4" wide, some leaves not lobed; bark of upper or younger trunk and branches smooth and white or gray-green, breaking into black ridges when older; fruit a small capsule releasing cottony seeds. **white poplar** p. 37
 3. Leaves pinnately lobed or at least not distinctly palmately lobed.
 6. Leaves with 3 main veins from near the base, with 1 to several lobes (some not lobed); multiple fruit of small, fleshy drupes, red to dark purple. **red mulberry** p. 50
 6. Leaves with 1 large main vein (midrib), lobed in various ways; fruit not as above.
 7. Leaves oddly lobed, 4 lobes, leaf wide and flat across the base and tip; flower very large and showy; terminal bud solitary, 1/2" long with 2 scales, resembles a duck's bill. **yellow-poplar** p. 52
 7. Leaves pinnately lobed, not flat across the tip; buds not as above.
 8. Flowers showy; buds not clustered at ends of twigs; fruit a small pome; thorns often present (some species of hawthorn have non-lobed leaves and/or no thorns). **downy hawthorn** p. 57
 8. Flowers not showy; several buds clustered at branch tip; fruit an acorn; no thorns present (**oaks**).
 9. Lobes of leaves blunt or rounded, not bristle tipped; acorn matures in 1 season, inner shell surface of acorn nut not hairy (**white oaks**).
 10. Ear-lobe-like leaf base; acorn with 1" to 3" long stalk. **English oak** p. 46
 10. Leaf base not as above; acorn with no stalk or a very short stalk.
 11. Leaves hairy on lower surface, usually deeply lobed below the middle and sometimes with coarse rounded teeth above; edge of acorn cap bristly; bark on twigs often in corky ridges. **bur oak** p. 43
 11. Leaves not hairy on lower surface, fairly evenly lobed over entire length; edge of acorn cap warty; bark on twigs not in corky ridges. **white oak** p. 44
 9. Lobes of leaves sharp, bristle tipped; acorn maturing the second season, inner surface of nut shell hairy (**red oaks**).
 12. Leaves 3 lobed near tip, lobes shallow, leaf lower surface tan colored and hairy to scaly. **blackjack oak** p. 46
 12. Leaves 5 to 11 lobed, lobes generally deep and distributed along leaf's entire length, leaf lower surface glabrous or slightly hairy.
 13. Leaves 7 to 11 lobed, openings between lobes extending half way or less to midrib; leaf surfaces glabrous except for small tufts of hair where veins join on lower side, upper surface dull to slightly glossy and dark green; acorns 3/4" to 1-1/4" long. **northern red oak** p. 45
 13. Leaves 5 to 9 lobed, openings between lobes extending more than half way to midrib; acorns 1/2" to 1" long.
 14. Acorn cap shallow, covering less than 1/3 of acorn; acorn small, 1/2" long, with longitudinal stripes. **pin oak** p. 46
 14. Acorn cap covering 1/3 or more of acorn; acorn 1/2" to 1" long, no stripes.
 15. Acorn cap with loose overlapping scales; acorn without concentric rings near tip; winter buds gray and densely woolly. **black oak** p. 45
 15. Acorn cap with tight overlapping scales; acorn with concentric rings near tip; winter buds not densely woolly. **scarlet oak** p. 47
 1. Leaves not lobed.
 16. Leaf margins entire (not serrate).
 17. Leaves and young twigs covered with silver or silver and brown scales; thorns often present; fruit drupe-like, yellowish, coated with silvery scales. **Russian-olive** p. 67
 17. Leaves and twigs not covered with silvery scales.

18. Leaves broadly heart-shaped, with 3 to 7 large veins radiating from the base; fruit a legume; small tree. **eastern redbud** p. 59
18. Leaves not heart-shaped; fruit not a legume.
 19. Leaves 10" to 12" long; fruit fleshy, sweet, green-yellow ripening to brown-black, 2" to 5" long; pith divided by woody plates. **pawpaw** p. 62
 19. Leaves generally less than 10" long; fruit and pith not as above.
 20. Twigs, fruit, and leaves with milky sap; spines or thorns often present on twigs; fruit large, round, green, rough-textured. **Osage-orange** p. 51
 20. Twigs, fruit, and leaves without milky sap; spines or thorns not present on twigs; fruit not as above.
 21. Several buds clustered at branch tip; fruit an acorn. **shingle oak** p. 47
 21. Buds not clustered at branch tip; fruit not an acorn.
 22. Stipule scars not encircling twig at each bud; flowers small, not showy; no terminal bud on twigs; fruit an orange to purple berry; bark broken into distinctive square blocks. **common persimmon** p. 68
 22. Stipule scars encircling twig at each bud; flowers medium to large and often showy; terminal buds large and silky; fruit an aggregate of follicles (**magnolias**).
 23. Leaves 6" to 10" long; flowers 2" to 3" wide, non-showy, appear in late-May to June; medium to large tree when mature. **cucumbertree** p. 51
 23. Leaves 3" to 6" across; flowers large, 5" to 10" wide, showy, appear in spring before the leaves; small, spreading tree. **saucer magnolia** p. 52
 16. Leaf margins not entire (usually serrate).
 24. Sap milky; multiple fruit of small, fleshy drupes, red to dark purple (resembles a blackberry); may have some lobed leaves as well. **red mulberry** p. 50
 24. Sap not milky; fruit not as above.
 25. Leaves and young twigs densely white-hairy on lower surface, sometimes lobed, coarsely serrate. **white poplar** p. 37
 25. Leaves and young twigs not densely white-hairy on lower surface, not lobed, finely or coarsely serrate.
 26. Petioles flattened in cross-section; fruit a capsule releasing cottony seeds (**poplars**).
 27. Columnar tree with upright branches and narrow crown. **Lombardy poplar** p. 38
 27. Crown not columnar and narrow.
 28. Mature leaves 4" to 5" wide, triangular in outline, margin with fairly large, rounded teeth; very common along streams and lakes. **eastern cottonwood** p. 36
 28. Mature leaves 1-1/2" to 3" wide, round to oval in outline, margin finely serrate; uncommon in Nebraska. **quaking aspen** p. 36
 26. Petioles not flattened in cross-section.
 29. Leaves with 3 to 5 nearly equal main veins from near the base.
 30. Leaves twice as long as wide, taper pointed, with uneven bases; pith usually chambered; bark of trunk with high, corky ridges; fruit a purple drupe. **hackberry** p. 50
 30. Leaves about as wide as long, heart-shaped; pith not chambered; bark of trunk without corky ridges; fruit several small nuts attached to a wing-like leaf. **American basswood** p. 67
 29. Leaves with 1 main vein (midrib) from the base.
 31. Fruit a samara with a thin wing surrounding the seed; leaves strongly 2-ranked and mostly doubly serrate, base usually uneven (**elms**).
 32. Leaves very rough on upper surface. **slippery elm** p. 48
 32. Leaves glabrous (or sometimes slightly rough in American elm) on upper surface.
 33. Twigs often with corky ridges or wings. **rock elm** p. 48
 33. Twigs without corky ridges or wings.
 34. Mature leaves 4" to 6" long, coarsely doubly serrate, base uneven. **American elm** p. 4
 34. Mature leaves less than 3" long, singly serrate or nearly so, base nearly even.
 35. Fruit matures in spring; bark on trunk not distinctive, gray with shallow furrows and long, flat ridges; commonly planted and naturalized tree. **Siberian elm** p. 49
 35. Fruit matures in fall; bark on trunk very distinctive, gray-green with orange and brown, lacy; only occasionally planted in Nebraska. **Chinese elm** p. 49
 31. Fruit not a samara; leaf base even or only slightly uneven, margins singly or doubly serrate.
 36. Each bud covered by a single, hood-like scale; leaves generally long and narrow (**willows**).
 37. Leaves broadly lanceolate; large shrub to small tree when mature. **peachleaf willow** p. 35
 37. Leaves narrowly lanceolate; large tree when mature.
 38. Upright habit; native to Nebraska. **black willow** p. 35
 38. Weeping habit; not native to Nebraska. **weeping willow** p. 36

- 36. Each bud covered by 2 or more scales.
- 39. Leaves coarsely, singly serrate or dentate; fruit an acorn or nuts in a bur.
 - 40. Terminal buds clustered; fruit an acorn (**oaks**).
 - 41. Acorn with a 1" to 4" stalk; leaves with rounded teeth or slightly lobed; bark peeling into papery scales on older twigs. **swamp white oak** p. 36
 - 41. Acorn with short stalk; leaves with sharp, angled teeth; bark on older twigs not as above.
 - 42. Large tree when mature with upright form; leaves 4" to 7" long. **chinkapin oak** p. 44
 - 42. Small tree when mature with spreading branches; leaves 2-1/2" to 5" long. **dwarf chinkapin oak** p. 43
 - 40. Buds not clustered at twig ends; fruit a prickly bur enclosing 1 to 3 nuts (**chestnuts**).
 - 43. Twigs glabrous; lateral buds 1/4" long. **American chestnut** p. 42
 - 43. Twigs hairy; lateral buds 1/8" long or less. **Chinese chestnut** p. 42
- 39. Leaves not coarsely serrate, mostly finely or doubly serrate; fruit not an acorn or nuts in a bur.
 - 44. Fruit a small capsule that releases hairy seeds that float in the air; terminal buds mostly 1/2" or longer; native to western Panhandle only and rarely planted (**poplars**).
 - 45. Leaves narrow (1" wide or less), lanceolate to ovate-lanceolate; petiole short (less than 1/3 length of blade); native only to western Panhandle in Sioux and Scottsbluff counties. **narrowleaf cottonwood** p. 37
 - 45. Leaves wider, ovate to ovate-lanceolate or rhombic; petiole longer (at least 1/2 length of blade).
 - 46. Leaves rhombic, 2" to 4" long; terminal buds 1/2" to 3/4" long, slightly resinous. **lanceleaf cottonwood** p. 37
 - 46. Leaves ovate to ovate-lanceolate, 3" to 6" long; terminal buds 3/4" to 1" long, very resinous and aromatic. **balsam poplar** p. 37
 - 44. Fruit not as above; buds less than 1/2" long.
 - 47. Fruit dry, wingless nutlet held in a papery sac or winged nutlets held in strobiles; terminal bud absent.
 - 48. Branches without short spurs; bark never peeling off in rolls, bark rough and platy; fruit a small nutlet enclosed in an inflated bag, several grouped together in a cone-like strobile. **eastern hophornbeam** p. 41
 - 48. Branches with short spurs; bark on younger trees smooth or peeling off in rolls; fruit a winged nutlet held in cone-like strobiles (**birches**).
 - 49. Bark of trunk white, papery; strobiles pendent. **paper birch** p. 40
 - 49. Bark of trunk bronze to brown to salmon-pink (not white), papery or smooth; strobiles erect or pendent.
 - 50. Bark dark bronze, smooth, doesn't peel; strobiles usually pendent; native to Sioux county, seldom planted. **water birch** p. 41
 - 50. Bark brown to salmon-pink, peeling on older branches and the trunk; strobiles erect; not native, often planted. **river birch** p. 41
 - 47. Fruit fleshy, pome or drupe; terminal bud present.
 - 51. Lower leaf with a dense row of light brown hairs along each side of midrib near the leaf base; fruit a dark purple to black one-seeded drupe; flowers small and not very showy; bark on young stems smooth and dark with many horizontally-elongated ridges. **black cherry** p. 55
 - 51. Midrib without hairs as above; fruit a multi-seeded pome; flowers larger and showy; bark not ridged as above.
 - 52. Pome red to green, up to several inches in diameter; lower leaf surfaces, bud, and young twig woolly. **apple** p. 55
 - 52. Pome dark red to purple to reddish-brown, 1/2" or less in diameter; lower leaf surfaces generally glabrous on mature leaves.
 - 53. Leaves oblong-ovate to oval; margin with fine sharp teeth; native to extreme southeast Nebraska and seldom planted. **downy serviceberry** p. 57
 - 53. Leaves broadly ovate to ovate, margin with fine rounded teeth; widely planted but not native or naturalized. **Bradford pear** p. 56

Key 5. Plants with alternate, compound leaves.

1. Leaves twice or three-times pinnately compound (some once compound).
 2. Leaflets 2" to 3" long, margins entire; fruit a 4" to 6" long, brown legume, 1-1/2" to 2" wide, with few large, hard seeds; no thorns. **Kentucky coffeetree** p. 59
 2. Leaflets usually 1" long or less, margins finely serrate; fruit a 12" to 18" long, brown legume, about 1" wide, with many small, hard seeds; stout thorns often present, especially on native trees. **honeylocust** p. 58
1. Leaves once compound.
 3. Lateral buds hidden by base of rachis; fruit a legume; leaflet margins entire (**legumes**).
 4. Spines or prickles usually present on twigs; base and tip of leaflets rounded. **black locust** p. 60
 4. Spines or prickles not present on twigs; tip of leaflets sharply angled. **Japanese pagodatree** p. 60
 3. Lateral buds exposed; fruit not a legume; leaflet margins entire, serrate, or otherwise toothed.
 5. Crushed leaves have a strong, musty, disagreeable odor, leaves 1' to 4' long, 11 to 41 leaflets; twigs very stout, pith solid, wide, light brown; fruit a yellow to red-orange samara. **tree-of-heaven** p. 61
 5. Crushed leaves without a musty, disagreeable odor; pith solid or chambered; fruit a nut, capsule, or small pome.
 6. Leaflet margins with coarse, rounded, irregular teeth; fruit a 3-valved papery capsule; flowers bright yellow and very showy. **goldenraintree** p. 66
 6. Leaflets margins with fine, regular teeth or entire; fruit not a capsule; flowers not as above.
 7. Leaflet margins entire; pith chambered, brown. **English walnut** p. 39
 7. Leaflet margins not entire; pith chambered or solid.
 8. Fruit a small, red pome; buds dark red and sticky. **American mountain-ash** p. 56
 8. Fruit a nut; buds brown or yellow, finely pubescent or scaly.
 9. Pith chambered, light brown; husk of nut does not split along lines when ripe ... **black walnut** p. 38
 9. Pith solid; husk of nut splits along lines when ripe.
 10. Leaflets mostly 9 to 17. **pecan** p. 40
 10. Leaflets mostly 5 to 9.
 11. Leaflets mostly 5 to 7; nut shell thick; terminal buds large, brown. **shagbark hickory** p. 39
 11. Leaflets mostly 7 to 9; nut shell thin; terminal buds sulfur-yellow. **bitternut hickory** p. 39



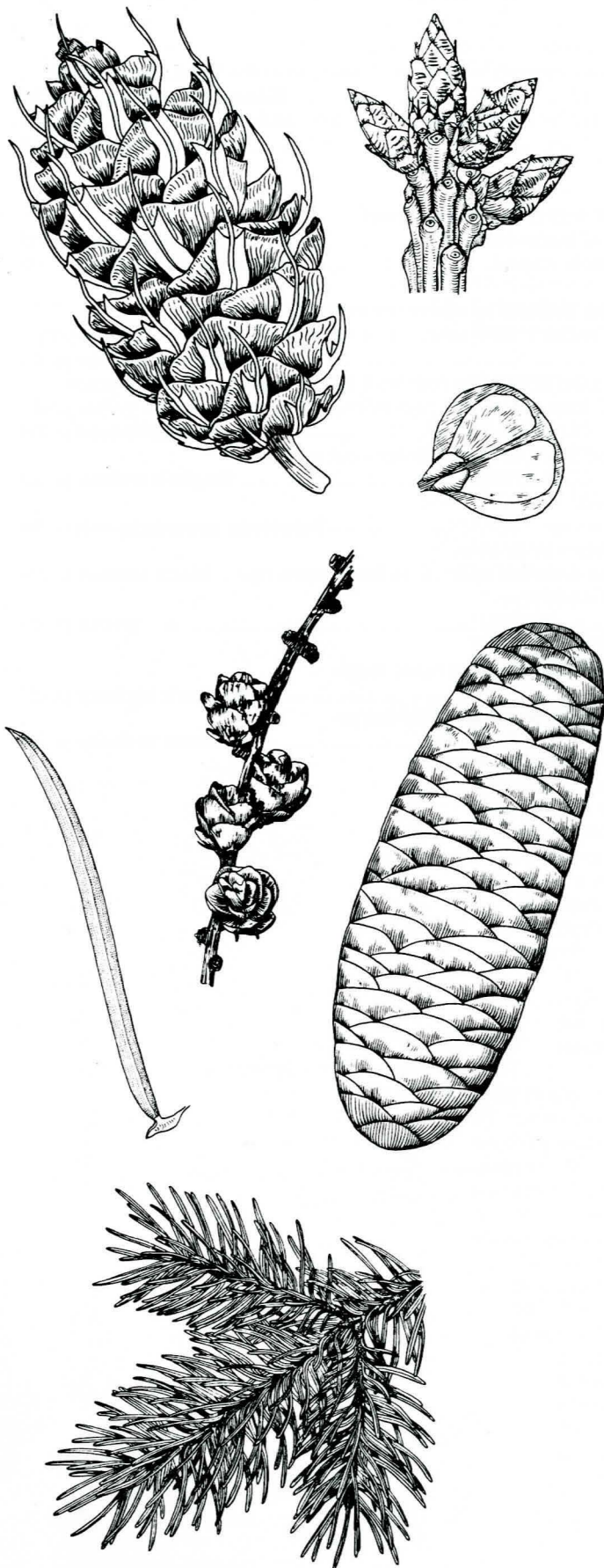
S

pecies Descriptions

The following pages contain descriptions and illustrations of the 97 species covered in this manual. For each species there are descriptions of the leaves, twigs, fruit, bark, wood, and some general comments about the usefulness of the species and its native range. Distinctive floral characteristics are described under general comments. A species' mode of bearing flowers (monoecious, dioecious, perfect flowers, etc.) is noted under the fruit description. Very distinctive characteristics are indicated by bold lettering. The species in this list are organized by family. The families are organized under the broad groups angiosperms and gymnosperms.

GYMNOSPERMS

Gymnosperms include many of the world's most interesting and useful trees. They have an ancient ancestry, going back well before the angiosperms. The main characteristic that separates them from the angiosperms is their naked or uncovered seed, usually held on a scale in a cone-like fruit. The Latin "*gymno/spermae*" actually means "*naked/seed*". (*Angiosperms*, on the other hand, have their seeds covered with protective tissue called an ovary.) Technically, gymnosperms are not flowering plants, though they have pollen- and seed-bearing structures that resemble flowers. Leaves for all of the following gymnosperms are evergreen except where noted.



Illustrations from Barnes and Wagner: Michigan Trees.

PINACEAE—Pine family. Cone-bearing trees with **needle-like** or **linear** leaves. Contains nine genera and about 210 species worldwide, mostly found in the Northern Hemisphere. Many species are very important timber trees.

Ponderosa Pine (*Pinus ponderosa*)

Leaves: Needles in groups of 2 and 3; 3" to 10" long; yellow-green; less sharp-pointed than those of Austrian pine; somewhat twisted; remain on tree 3-6 years.

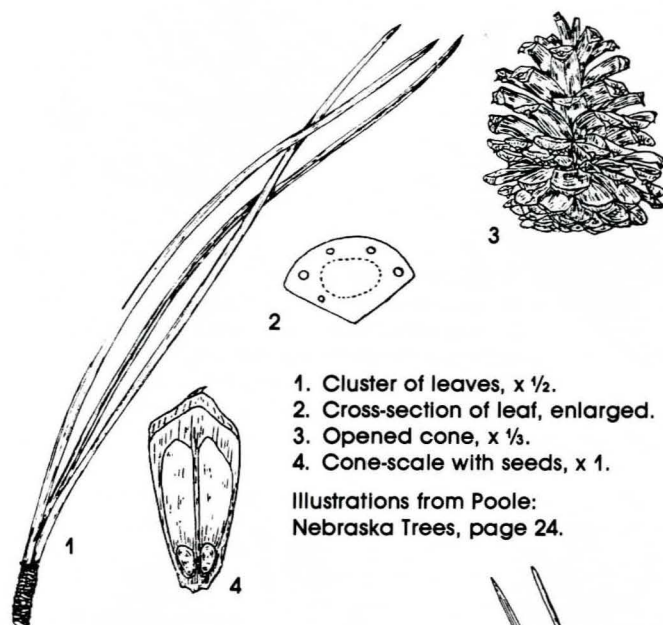
Twigs: Stout; orange-brown; smell like turpentine when crushed. Buds about 1/2" long; usually covered with resin droplets; light brown.

Fruit: Woody cone; 3" to 6" long; **each scale armed with a short, sharp spine**; monoecious.

Bark: Dark brown to black on younger trees; older trees have large plates, orange to cinnamon-red, separated by deep furrows.

Wood: Very important; sapwood white to yellow; heartwood yellow to light brown; growth rings distinct; used for lumber, millwork, and railroad ties.

General: Native to northwestern Nebraska and much of the western U.S. Normal growth rate in Nebraska is relatively slow. Resists fires with thick bark. Drought resistant. Shade intolerant.



1. Cluster of leaves, x 1/2.
2. Cross-section of leaf, enlarged.
3. Opened cone, x 1/3.
4. Cone-scale with seeds, x 1.

Illustrations from Poole:
Nebraska Trees, page 24.

Austrian Pine (*Pinus nigra*)

Leaves: Needles in bundles of 2; 3" to 6" long; slender; stiff; sharp-pointed; yellow-green to blue-green; remain on tree 3-4 years.

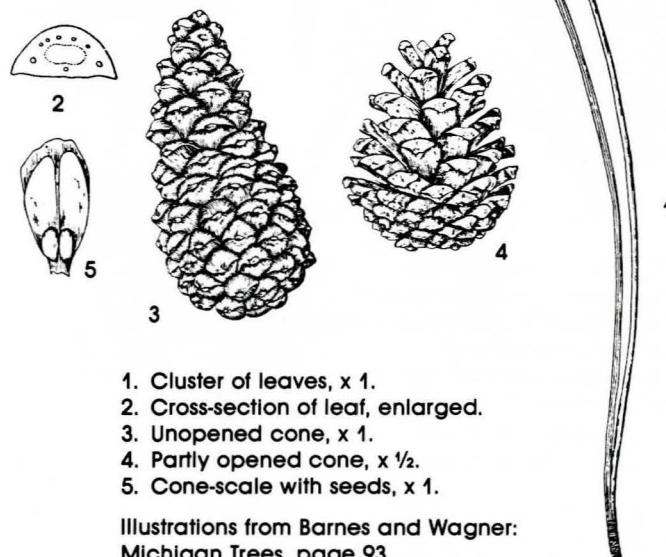
Twigs: Orange-brown; glabrous. Buds silvery, 1/2" to 3/4" long.

Fruit: Woody cone; about 2" to 3" long; **non-pointed scales**; monoecious.

Bark: Rough; platy; dark brown turning gray when older.

Wood: Sapwood nearly white; heartwood red-brown, somewhat oily and resinous; growth rings distinct.

General: A native of Europe, but grows well in Nebraska. Similar in size and habit to native ponderosa pine. Shade intolerant.



1. Cluster of leaves, x 1.
2. Cross-section of leaf, enlarged.
3. Unopened cone, x 1.
4. Partly opened cone, x 1/2.
5. Cone-scale with seeds, x 1.

Illustrations from Barnes and Wagner:
Michigan Trees, page 93.

Scotch Pine * Scots Pine (*Pinus sylvestris*)

Leaves: Needles in groups of 2; about 1-1/2" to 3" long; blue-green, may turn yellow-green in Nebraska in winter; **often twisted**.

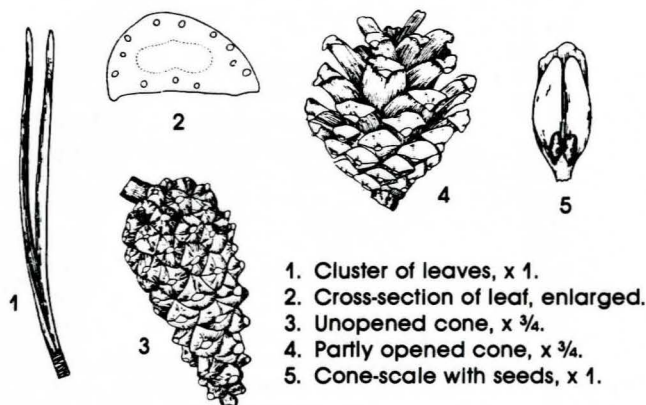
Twigs: Medium-thick; dull gray-yellow; roughened by scales at base of leaf clusters. Buds 1/4" to 1/2" long; pointed; with fringed scales; red-brown; resinous.

Fruit: Woody cone; 1-1/2" to 2" long; scales with raised pyramid-shaped tips; monoecious.

Bark: **Distinctively orange colored on upper limbs and trunk.**

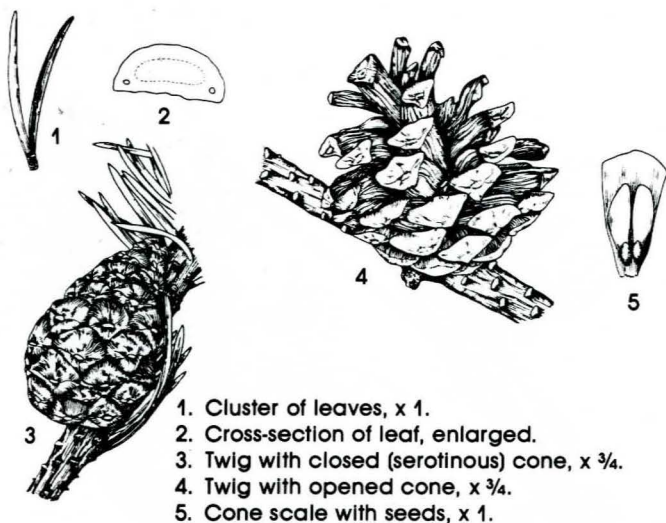
Wood: Little used in the U.S. wood products industry; little data available.

General: Native throughout Europe, but widely planted in Nebraska. A very desirable species, preferred for Christmas tree production. Shade intolerant.



1. Cluster of leaves, x 1.
2. Cross-section of leaf, enlarged.
3. Unopened cone, x 3/4.
4. Partly opened cone, x 3/4.
5. Cone-scale with seeds, x 1.

Illustrations from Barnes and Wagner:
Michigan Trees, page 87.



Illustrations from Barnes and Wagner:
Michigan Trees, page 85.

Jack Pine (*Pinus banksiana*)

Leaves: Needles in groups of 2; **3/4" to 1-1/2" long**; twisted; yellow-green; remain on tree 2-3 years.

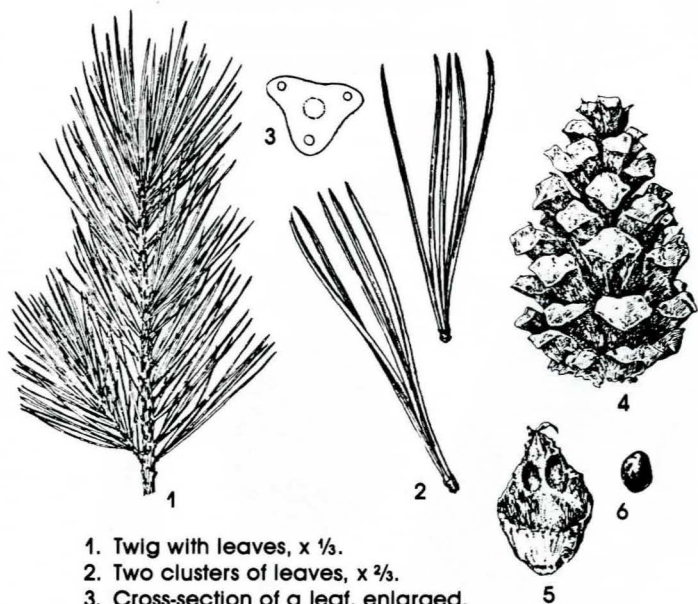
Twigs: Thin; tough; flexible; older twigs rough and red-brown. Buds 1/4" long; very resinous; light red-brown.

Fruit: Woody cone; no stalk; 1-1/2" to 2" long; gray; curved; non-pointed scales; **usually remain closed and on tree for many years**; monoecious.

Bark: Dark brown; shallow ridged.

Wood: Moderately important; light and soft; heartwood light brown; used for fence posts, pulp.

General: Native to Lake States and much of central and eastern Canada (not Nebraska). Widely planted by Charles Bessey and others on the Halsey District of the Nebraska National Forest in the Sandhills. Tough tree, drought tolerant. Seeds-in quickly after fires when heat causes old cones to open and release seed. Very shade intolerant.



1. Twig with leaves, x 1/3.
2. Two clusters of leaves, x 2/3.
3. Cross-section of a leaf, enlarged.
4. Mature cone, x 1/2.
5. Single scale from the cone.
6. A seed, x 2/3.

Illustrations from Poole:
Nebraska Trees, page 18.

Limber Pine (*Pinus flexilis*)

Leaves: Needles in groups of 5; 1-1/2" to 3" long; rigid; dark green; covered with lengthwise rows of fine, white lines; remain on tree 5-6 years.

Twigs: Stout; **very flexible**; glabrous; silver-white to gray. Buds 1/3" to 1/2" long; pointed.

Fruit: Woody cone; short stalk; 3" to 8" long; thick, non-pointed scales; large, winged seeds; monoecious.

Bark: Thin; smooth; white to gray.

Wood: Unimportant; light and soft.

General: Native to southwest-Panhandle of Nebraska and to the Intermountain U.S. Often very long-lived and slow growing, occurring on dry, harsh sites. Very shade intolerant.

Eastern White Pine (*Pinus strobus*)

Leaves: Needles in groups of 5; 3" to 5" long; dark blue-green, turning light green in winter in Nebraska; straight; slender; flexible; remain on tree 2-3 years.

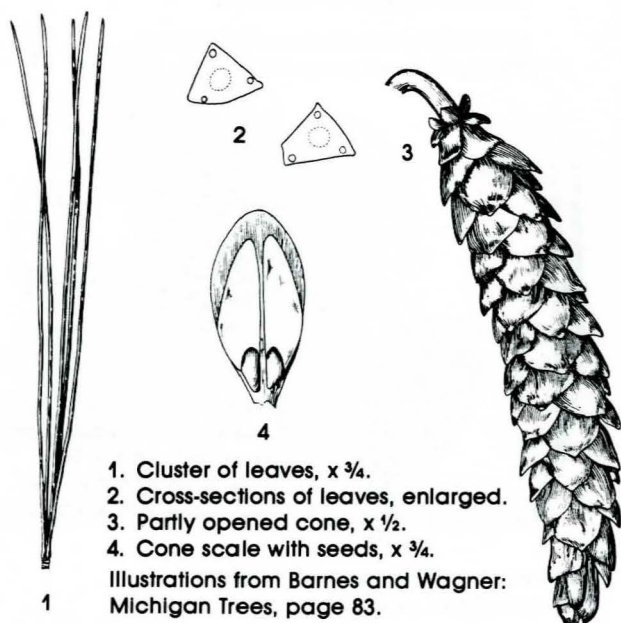
Twigs: Orange-brown; glabrous or with only a few, fine hairs. Buds covered with thin, red or orange-brown, non-pointed scales.

Fruit: Woody cone; **about 4" to 8" (usually 5") long**; narrow; stalked; thin, non-pointed scales; monoecious.

Bark: Thin, smooth, and gray on young stems; breaks into rectangular plates on older stems.

Wood: Important, especially historically; sapwood nearly white; heartwood darker; growth rings distinct; used for lumber, fine millwork, sailing-ship masts.

General: Native to eastern U.S. (not Nebraska), but may be planted as an ornamental. Fast growth on good sites. Shade tolerant when young, intolerant when older.



1. Cluster of leaves, x 3/4.
2. Cross-sections of leaves, enlarged.
3. Partly opened cone, x 1/2.
4. Cone scale with seeds, x 3/4.

Illustrations from Barnes and Wagner:
Michigan Trees, page 83.

Tamarack * Eastern Larch (*Larix laricina*)

Leaves: Needles borne singly; 3/4" to 1-1/4" long; **deciduous**; blue-green, turning yellow in fall; triangular or 4-sided in cross-section; spirally arranged on new growth, on older growth occurring in dense clusters on spur shoots.

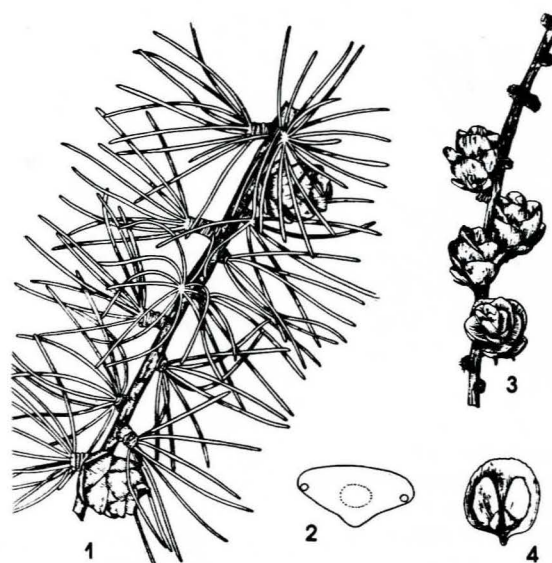
Twigs: Slender; glabrous; orange-brown; obvious spur shoots on older growth. Buds round; dark red.

Fruit: Cone; 1/2" to 3/4" long; **upright**; **less than 20 scales**; monoecious.

Bark: Thin and smooth on young stems; red-brown and scaly on older stems.

Wood: Not widely used; sapwood yellowish-white; heartwood yellowish-brown; strong; hard; durable; used for poles, railroad ties, lumber.

General: Native to northeastern U.S., Lake States, and most of Canada (not Nebraska). Has been shown to survive and thrive in eastern Nebraska, with a moderate growth rate. Prefers moist soil. Shade intolerant.



1. Autumn branchlet, with leaves and cones, x 1.
2. Cross-section of leaf, enlarged.
3. Fruiting branchlet in winter, x 1.
4. Cone-scale with seeds, x 2.

Illustrations from Otis:
Michigan Trees, page 79.

European Larch (*Larix decidua*)

****See Tamarack description and illustrations****

Major differences:

Fruit: Cone; 3/4" to 1-1/2" long; **upright**; **40 to 50 scales**; monoecious.

General: Native to mountains of northern and central Europe (not Nebraska). Grows well in eastern Nebraska.

Blue Spruce * Colorado Blue Spruce (*Picea pungens*)

Leaves: Needles borne singly; about 1" long; blue-white to dark green; 4-angled; sharp pointed; extend at right angles all around twig; very fragrant when crushed.

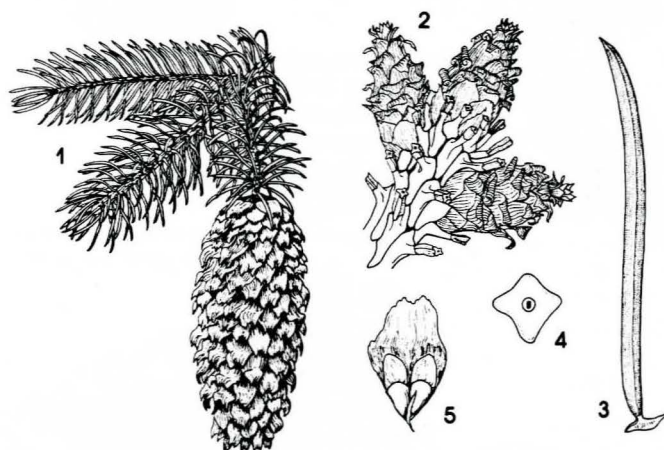
Twigs: Glabrous; leaves on a short stalk that remains part of the twig, so twig rough. **Buds with scales that tend to turn out into a rosette**, especially in spring.

Fruit: Papery cone; **about 2-1/2" to 4" long**; light chestnut-brown; monoecious.

Bark: Light to dark gray; made-up of thin scales; in wide ridges on older trees.

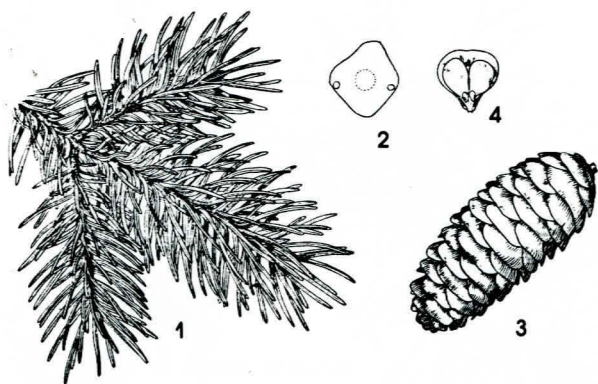
Wood: Moderate importance; heartwood not distinct; nearly white to light brown; growth rings distinct.

General: Native to Colorado and Intermountain states (not Nebraska). Will as often be green as blue. Slow growing. Intermediate shade tolerance.



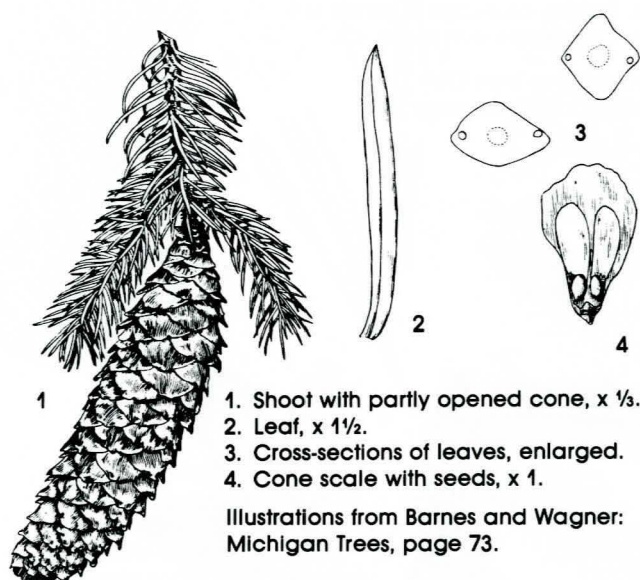
1. Winter shoot, with leaves and cone, x 1/3.
2. Shoot with winter buds, leaves cut off, x 2.
3. Leaf, x 2 1/2.
4. Cross-section of leaf, enlarged.
5. Cone scale with seeds, x 1.

Illustrations from Barnes and Wagner:
Michigan Trees, page 79.



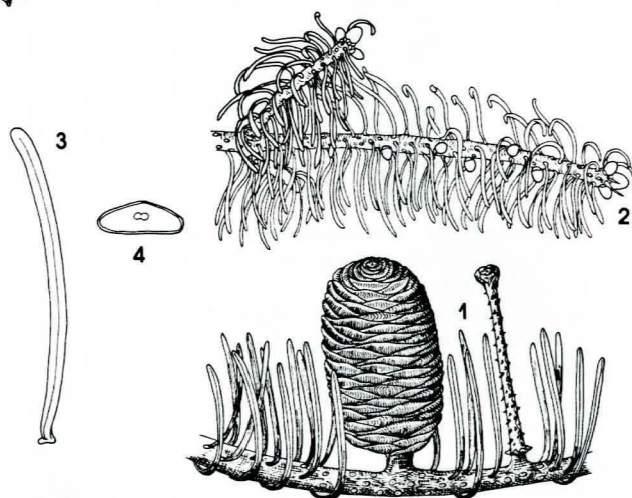
1. Winter branchlet, x 1.
2. Cross-section of leaf, enlarged.
3. Partly open cone, x 1.
4. Cone-scale with seeds, x 1.

Illustrations from Otis:
Michigan Trees, page 75.



1. Shoot with partly opened cone, x 1/3.
2. Leaf, x 1 1/2.
3. Cross-sections of leaves, enlarged.
4. Cone scale with seeds, x 1.

Illustrations from Barnes and Wagner:
Michigan Trees, page 73.



1. Winter shoot with leaves, cone, and cone axis, x 1/2.
2. Winter shoot with buds, x 1/2.
3. Leaf, x 2/3.
4. Cross-section of leaf, enlarged.
5. Cone scale with seeds, x 1.

Illustrations from Barnes and Wagner:
Michigan Trees, page 67.

White Spruce * Black Hills Spruce (*Picea glauca*)

Leaves: Needles borne singly; 1/3" to 3/4" long; often crowded on upper side of branch by twisting of needles from the lower side; tips pointed but not sharp; blue-green, sometimes with white tinge; 4-angled; pungent when crushed.

Twigs: Glabrous; slender, orange-brown to gray; pungent odor when crushed. Buds 1/8" to 1/4" long; red-brown or light brown; not resinous; tips of scales often curve back.

Fruit: Papery cone; 1-1/2" to 2-1/2" long; light brown colored; margins of cone scales rounded; monoecious.

Bark: Thin, gray-brown; flaky or scaly; newly exposed inner bark silvery.

Wood: Important in native range; light colored, with little difference between heartwood and sapwood; used for pulp, millwork, boxes, and piano sounding boards.

General: Native in Black Hills, northern Lake States, northeastern U.S., and throughout Canada and Alaska (not Nebraska). Very desirable landscape tree, though slow growing. Shade tolerant.

Norway Spruce (*Picea abies*)

Leaves: Needles borne singly; about 1" long; sharp; dark green; 4-angled.

Twigs: Long twigs often hang down and sway in the wind except on young trees; glabrous; leaves on a short stalk that remains part of the twig. Buds 1/4" long; red-brown or light brown; not resinous; scales often with spreading tips; rosette shaped.

Fruit: Large papery cone; 4" to 7" long; light tan colored; monoecious.

Bark: Light to dark gray; made-up of thin scales; in wide ridges on older trees.

Wood: Important in Europe and somewhat in eastern U.S.; light colored; indistinct heartwood; slightly resinous; used for pulp and paper.

General: Native to Europe (not Nebraska). Widely planted ornamentally in U.S. Gets taller and wider, grows faster than blue spruce. Intermediate shade tolerance.

White Fir * Concolor Fir (*Abies concolor*)

Leaves: Needles borne singly; 2" to 3" long; flattened in cross-section; silver-blue to silver-green.

Twigs: Moderately stout; glabrous; yellow-green to brown-green; round leaf scar. Buds 1/4" long or less; tend to be sticky; yellow-brown.

Fruit: Cone; 3" to 5" long; oblong; green to purple; borne upright on upper branches; scales deciduous; monoecious.

Bark: Thin; smooth; gray; with resinous blisters; becoming furrowed and ridged on older trunks.

Wood: Moderate importance; soft and brittle; white to yellow-brown; even grained; growth rings distinct.

General: Native to southern Rocky Mountains and California (not Nebraska). Used as an ornamental throughout much of the United States. Shade tolerant.

Balsam Fir (*Abies balsamea*)

****See White Fir description and illustrations****

Major differences:

Leaves: Needles **3/4" to 1-1/2" long; two-ranked (flattened horizontally from twig) on lower branches;** dark green on top, with **2 silvery bands below.**

Twigs: Slender.

General: Native to northeastern U.S., Lake States, and eastern and central Canada (not Nebraska). Will survive in eastern Nebraska, but grows slow and should be planted on protected sites. Popular Christmas tree in much of U.S. Shade tolerant.

Douglas-fir (*Pseudotsuga menziesii*)

Leaves: Needles borne singly; about 1" long; **flat;** blunt; yellow-green; remain on tree 5-8 years.

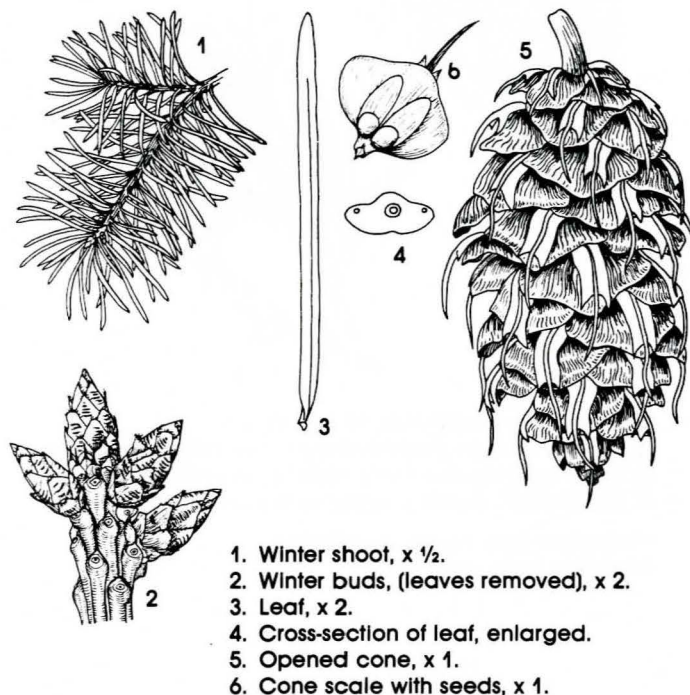
Twigs: Slender; flexible; covered with fine hairs; glabrous when leaves are detached. Buds cigar-shaped; sharp-pointed; about 1/2" long; brown.

Fruit: Thin-scaled cone; about 3" long; hangs down; **each scale has a 3-pointed woody bract attached to it;** monoecious.

Bark: Smooth; gray-brown; with resin blisters on young trees; rough and thick on older trees.

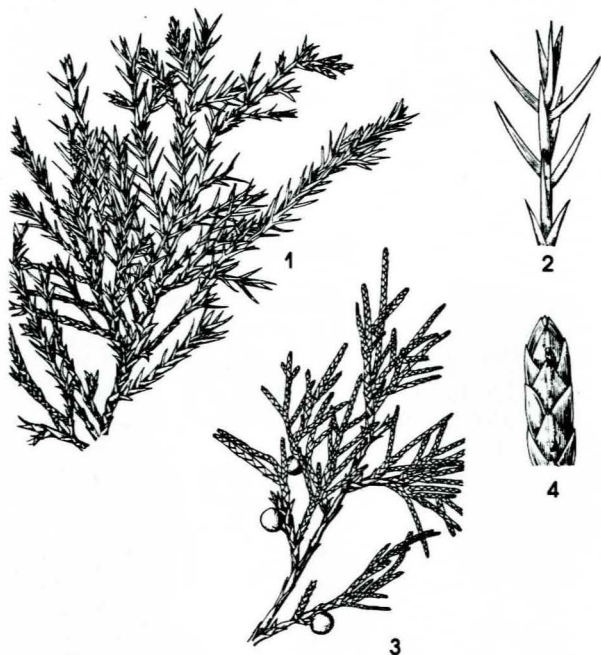
Wood: Very important; sapwood white to yellow; heartwood yellow to red; growth rings very distinct; used for high-quality lumber and plywood.

General: Native to the Rocky Mountain states and Pacific coastal states (not Nebraska). Not a true fir. Very valuable western timber tree. Narrower crown than many conifers. Good growth rate in Nebraska. Intermediate shade tolerance.



1. Winter shoot, x 1/2.
2. Winter buds, (leaves removed), x 2.
3. Leaf, x 2.
4. Cross-section of leaf, enlarged.
5. Opened cone, x 1.
6. Cone scale with seeds, x 1.

Illustrations from Barnes and Wagner:
Michigan Trees, page 95.



1. Shoot with needle-shaped leaves, x $\frac{2}{3}$.
2. Tip of shoot, showing needle-shaped leaves, enlarged.
3. Cone-bearing shoot with scalelike leaves, x $\frac{2}{3}$.
4. Tip of shoot, showing scalelike leaves, enlarged.

Illustrations from Barnes and Wagner:
Michigan Trees, page 99.

CUPRESSACEAE—Cypress family. Trees with fleshy, woody, or leathery cones; scale-like or awl-shaped leaves. Contains 15 genera and about 140 species, located throughout the world. Includes many commercially important trees.

Eastern Redcedar (*Juniperus virginiana*)

Leaves: Awl-shaped or scale-like, both kinds often on the same tree; blue-green **turning a red-brown to purple color in winter**.

Twigs: Slender; green or red-brown in color; finest twigs covered by foliage. Buds very small; indistinct; not useful for identification purposes.

Fruit: Berry-like; round; about 1/4" in diameter; blue or purple; often with white, waxy coating; contains 2 or 3 hard seeds; **ripens in one season**; dioecious.

Bark: Brown to gray; fibrous; peels in narrow strips.

Wood: Moderate importance; sapwood nearly white; heartwood purple or rose-red to red-brown; characteristic odor; growth rings distinct; used for fence posts, closet and chest lining, novelties, ornamental purposes.

General: Native to eastern two-thirds of Nebraska and the rest of the eastern U.S. Often called cedar, but not a true cedar. Hardy and long-lived. Medium to slow growth. Very good windbreak tree. Intermediate shade tolerance.

Rocky Mountain Juniper (*Juniperus scopulorum*)

****See Eastern Redcedar illustrations****

Leaves: Awl-shaped or scale-like; similar to eastern redcedar; pressed close to the twig; variable in color; **retains blue-green color in winter**.

Twigs: Slender, older twigs red-brown and nearly glabrous; bark peeling off; finest twigs covered by foliage. Buds very small; indistinct; not useful for identification purposes.

Fruit: Berry-like fruit **takes two years to mature**; nearly round; 1/4" to 1/3" in diameter; bright blue; often covered with a white coating; usually contains 2 seeds; dioecious.

Bark: Very similar to eastern redcedar.

Wood: Similar to eastern redcedar; soft; lightweight; light red heartwood with narrow white sapwood.

General: Occurs naturally in western Nebraska and into the Rocky Mountains and southwest Canada. Very drought resistant, often used in windbreaks in western Nebraska. Intermediate shade tolerance.

Northern White-cedar * Eastern Arborvitae (*Thuja occidentalis*)

Leaves: Small; scale-like; flattened along twig; yellow-green.

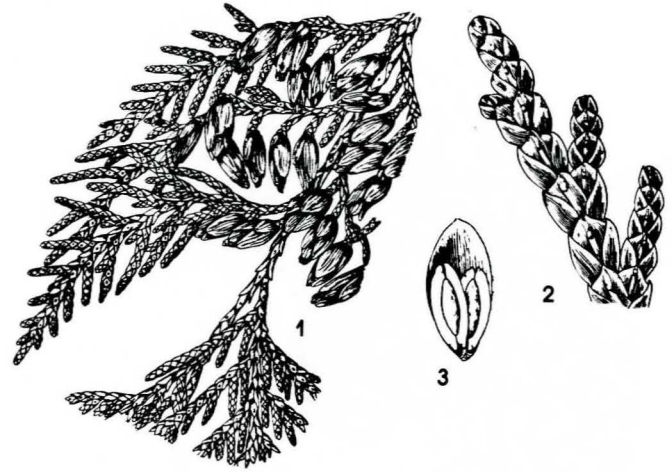
Twigs: Slender; covered by foliage; **arranged in horizontally flattened or drooping sprays**. Buds very small; indistinct; not useful for identification purposes.

Fruit: Cone; **1/3" to 1/2" long**; upright; 4 fertile scales plus several infertile scales; monoecious.

Bark: Thin; narrow, interlacing ridges; red-brown to gray-brown; fibrous.

Wood: Moderately important; sapwood nearly white and thin; heartwood light brown; lightweight; very resistant to decay; used for poles, railroad ties, fence posts, fencing, lumber.

General: Native to northeast U.S., Lake States, Appalachian Mountains, and southern Canada (not Nebraska). Not a true cedar. Small tree, medium to slow growth. Good as visual screen, windbreak. Cold hardy but may need protection on harsh sites. Shade tolerant.



1. Fruiting branchlet, x 1.
2. Tip of branchlet, enlarged.
3. Cone-scale with seeds, x 3.

Illustrations from Otis:
Michigan Trees, page 101.

Oriental Arborvitae (*Thuja orientalis*)

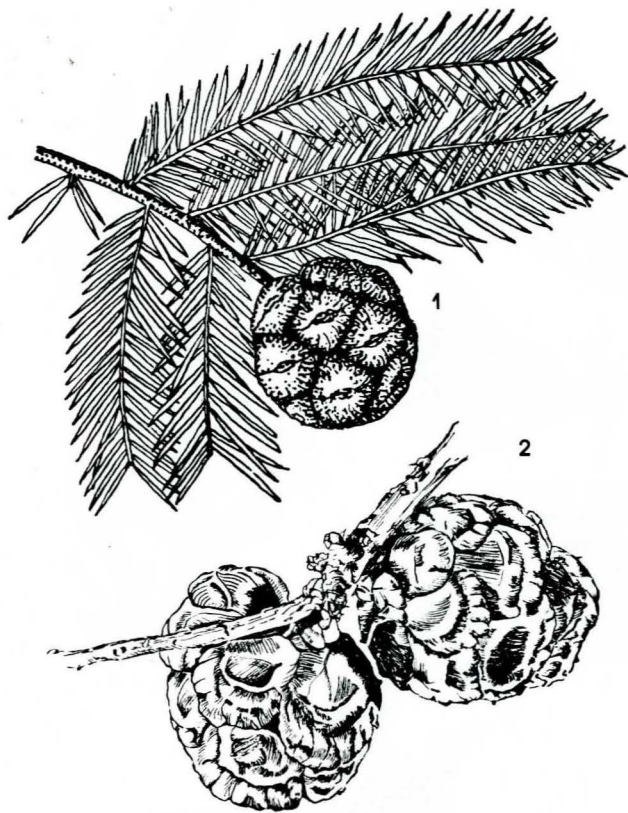
****See Northern White-Cedar description and illustrations****

Major differences:

Twigs: Arranged in vertically flattened sprays.

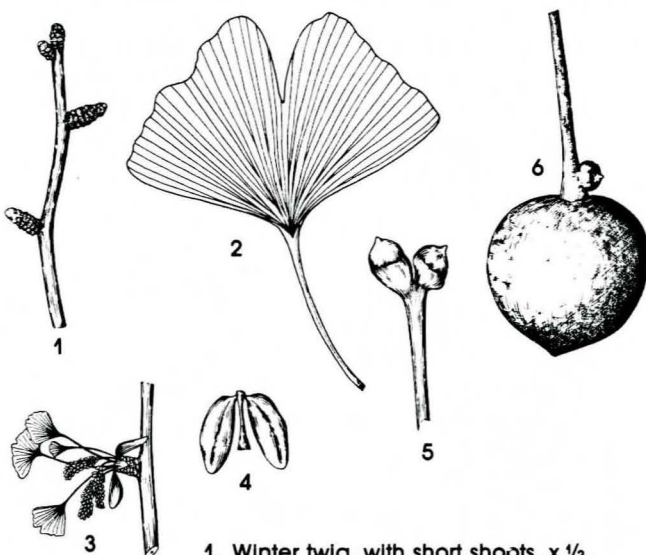
Fruit: Cone; 1/3" to 1" long; upright; **6 to 8 scales**, thicker than above.

General: Native to Korea, Manchuria, and northern China (not Nebraska). Medium to slow growth. Often planted in Nebraska, but generally not cold hardy and will winter burn.



1. Deciduous twig with leaves, x 1.
2. Opening cones on twig, x 1½.

Illustration 1 from Preston: No. Amer. Trees, page 92.
Illustration 2 by Renee Lanik.



1. Winter twig, with short shoots, x ½.
2. Leaf, x ½.
3. Pollen-bearing twig, x ½.
4. Pollen sacs, enlarged.
5. Unfertilized seed twig, enlarged.
6. Mature fleshy seed, x ¾.

Illustrations from Barnes and Wagner:
Michigan Trees, page 63.

TAXODIACEAE—Redwood family. Trees with small, woody cones; linear or awl-shaped leaves. Contains nine genera and 13-15 species, including redwood and Sequoia. Located mostly in the Northern Hemisphere. Very important timber trees, though limited in number.

Baldcypress (*Taxodium distichum*)

Leaves: Linear or needle-like; 1/2" to 3/4" long; spirally arranged; **deciduous**; small twigs fall off in autumn with needles attached; yellow-green.

Twigs: Branch-end or terminal twigs have buds and are not deciduous; lateral or side twigs deciduous with needles still attached. Buds small; round; several overlapping scales.

Fruit: **Woody cone; round**; hangs down; 3/4" to 1" diameter; brown; several wrinkled scales; falls apart when mature; seeds small, 3-winged; monoecious.

Bark: Thin and scaly to fibrous; red-brown to gray.

Wood: Important; light to dark brown; very durable and rot resistant; used for construction, siding, shingles, etc.

General: Native throughout the southeast U.S. and as far north as southeast Missouri and southern Illinois (not Nebraska). Typically grows in swamps in the South. Can get 1,000 to 2,000 years old in native areas. Does well in the eastern half of Nebraska as an ornamental. Shade intolerant.

GINKGOACEAE—Ginkgo family. Only one species, ginkgo (*Ginkgo biloba*), occurs in this family. Native only to China and Japan.

Ginkgo * Maidenhair Tree (*Ginkgo biloba*)

Leaves: Broad; deciduous; **fan-shaped**; with or without notched margin; **branching or dichotomous venation, gives appearance of long, flowing "maiden's hair"**; spiral arrangement on young twigs; on older branches only occur on short, spur shoots; bright yellow-green; turn bright yellow in fall; petiole 2" to 4" long.

Twigs: Stout; light brown first year, becoming gray with stringy, peeling bark; short spur shoots on older twigs. Buds with overlapping scales, brown.

Fruit: Plum-like in shape and size; about 1" to 1-1/2" long; tan to orange; fleshy covering very messy and bad smelling; monoecious.

Bark: Light gray-brown; tight ridges with darker furrows.

Wood: Unimportant.

General: A native of China and Japan (not Nebraska). Grows well in Nebraska. Strong, upright growth form. Tolerates urban environments. Only male trees should be planted because of bad smelling, messy fruit. Shade intolerant.

ANGIOSPERMS

Angiosperms are the most common, complex, and widely distributed plants on Earth. Also known as flowering plants, they are found from the tropics to the tundra and from deserts to mountain tops. Some are small, primitive discs that float on water, while others are large trees like the bur oak. Most of our broad-leaved trees are angiosperms. As mentioned earlier, they are separated from the gymnosperms by the ovary covering their seeds. All angiosperm trees planted in or native to Nebraska have deciduous leaves.

SALICACEAE—Willow family. Contains two genera and 335 species. Widely distributed around the world, but more common in cooler areas of the Northern Hemisphere. Usually found in moist areas.

Black Willow (*Salix nigra*)

Leaves: Simple; alternate; lanceolate; serrate margin; 3" to 6" long, 3/8" to 3/4" wide; **green above and below**; petiole short.

Twigs: Slender to stout; often brittle. No terminal bud; lateral buds red-brown, small, covered by a single cap-like scale.

Fruit: A capsule; about 1/4" long; short-stalked; seeds very small, hairy; dioecious.

Bark: Brown to nearly black; thick on older trees; intertwining ridges.

Wood: Moderately important; sapwood white; heartwood light brown to red-brown; growth rings unclear; diffuse-porous; rays barely visible with a hand lens; used for pulp, charcoal, and lumber.

General: Native to eastern Nebraska and most of the eastern U.S. Usually found on moist soils along the banks of streams and lakes. Grows rapidly and matures in 50 to 70 years. Can get very large. Very shade intolerant.

Other Willows:

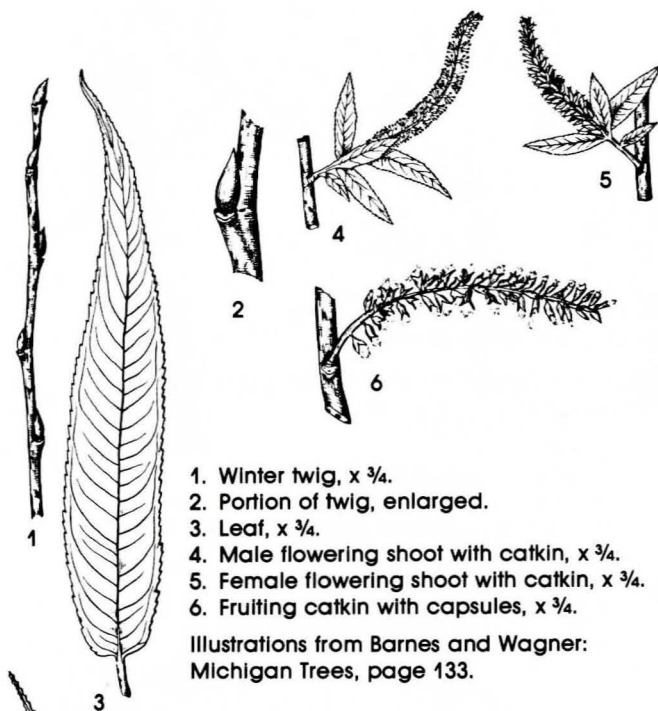
(All have alternate, simple leaves)

****See also *Black Willow* description and illustrations****

Peachleaf Willow (*Salix amygdaloides*)

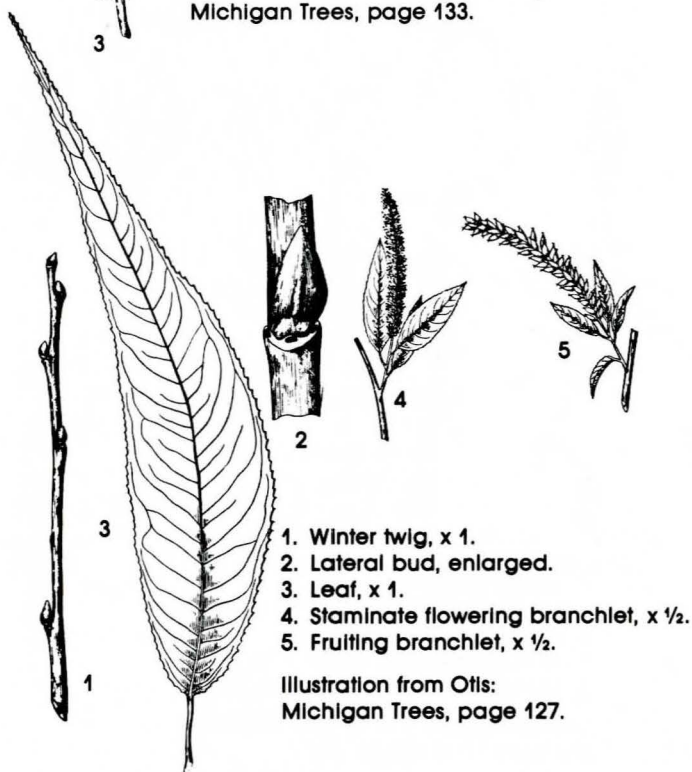
Leaves: **Pale or bluish below**; lanceolate to ovate-lanceolate; more abruptly pointed than black willow.

General: Native throughout most of Nebraska, north-central and Rocky Mountains in U.S., and southern Canada. Generally shrubby or a small tree.



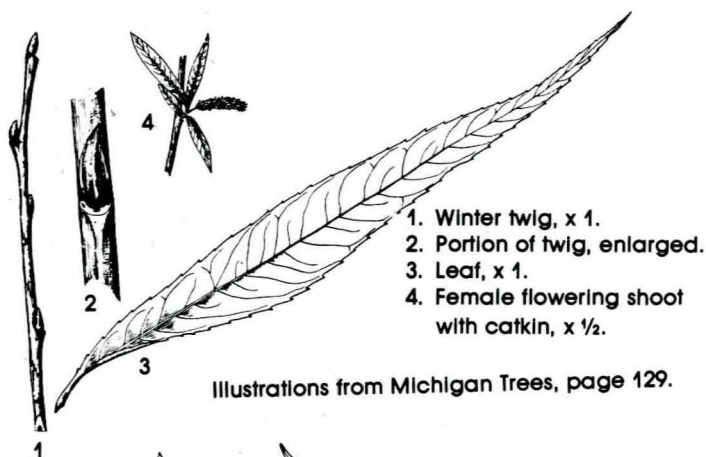
1. Winter twig, x 3/4.
2. Portion of twig, enlarged.
3. Leaf, x 3/4.
4. Male flowering shoot with catkin, x 3/4.
5. Female flowering shoot with catkin, x 3/4.
6. Fruiting catkin with capsules, x 3/4.

Illustrations from Barnes and Wagner:
Michigan Trees, page 133.



1. Winter twig, x 1.
2. Lateral bud, enlarged.
3. Leaf, x 1.
4. Staminate flowering branchlet, x 1/2.
5. Fruiting branchlet, x 1/2.

Illustration from Otis:
Michigan Trees, page 127.



Illustrations from Michigan Trees, page 129.

Weeping Willow (*Salix babylonica*)

Leaves: Pale below; narrow-lanceolate.

General: Native to China (not Nebraska). Popular shade tree with a **weeping or drooping form**. Grows fast, short-lived. Dirr feels that this tree is actually a variety of **white willow (*Salix alba* var. *tristis*)**.

Eastern Cottonwood (*Populus deltoides*)

Leaves: Simple; alternate; **deltoid to ovate-deltoid**; 3" to 6" long, 4" to 5" wide; rounded teeth on margin; glabrous; turn bright gold in fall; petiole 1-1/2" to 3" long, **flattened laterally**, causing leaf to flutter in the wind.

Twigs: Yellow-brown; sticky; angular. Terminal buds 3/4" long, pointed, shiny-brown, resinous, fragrant when crushed; lateral buds smaller.

Fruit: A small capsule; about 1/3" long; several together like a string of beads; capsule contains many small, cottony seeds; dioecious.

Bark: Yellow-green; smooth on young trunks; on older trunks thick, gray, deeply furrowed with flat-topped ridges.

Wood: Important; sapwood white; heartwood gray; often not a clearly defined change from sapwood to heartwood; growth rings unclear; diffuse-porous; rays not visible without magnification; used in lumber, pallets, veneer.

General: State tree of Nebraska. Native to most of Nebraska and most of the eastern U.S. Usually found along streams and lakes. Very easily grown by planting a piece of a young branch in moist soil. Very shade intolerant. **Plains cottonwood (*Populus sargentii*)**, found in western Nebraska, may actually be a variety of eastern cottonwood.

Quaking Aspen * Trembling Aspen (*Populus tremuloides*)

Leaves: Simple; alternate; **nearly round to broadly ovate**; 1-1/2" to 3" diameter; finely serrate margin; pointed apex; glabrous; yellow-green to green, turning bright yellow to orange in fall; petiole 1-1/2" to 3" long, **flattened laterally**, causing leaf to flutter in the wind.

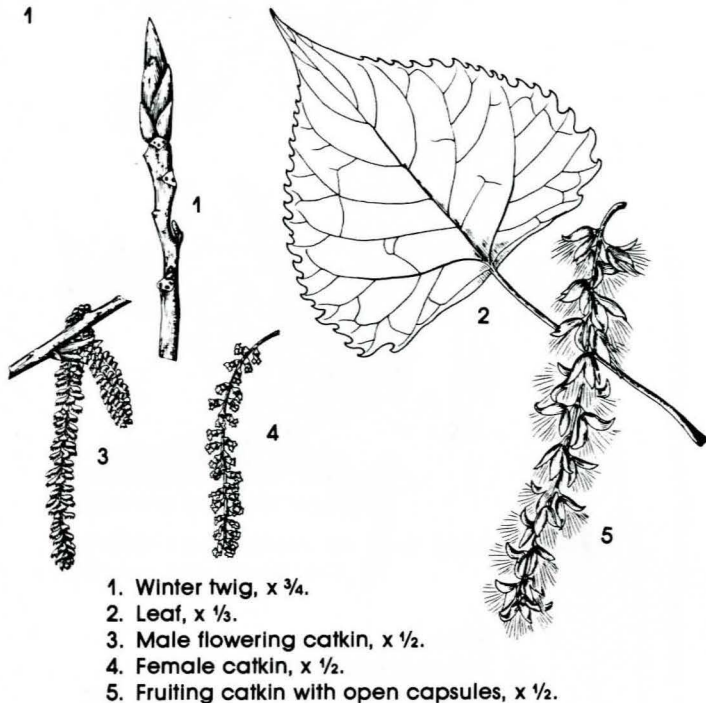
Twigs: Slender; glabrous; red-brown. Terminal bud 1/4" to 1/2" long, sharp-pointed, sometimes resinous, covered by red-brown overlapping scales; lateral buds smaller, curve inward.

Fruit: Capsule; narrow conical; 1/4" long; gray; hairy; seeds small, light brown; dioecious.

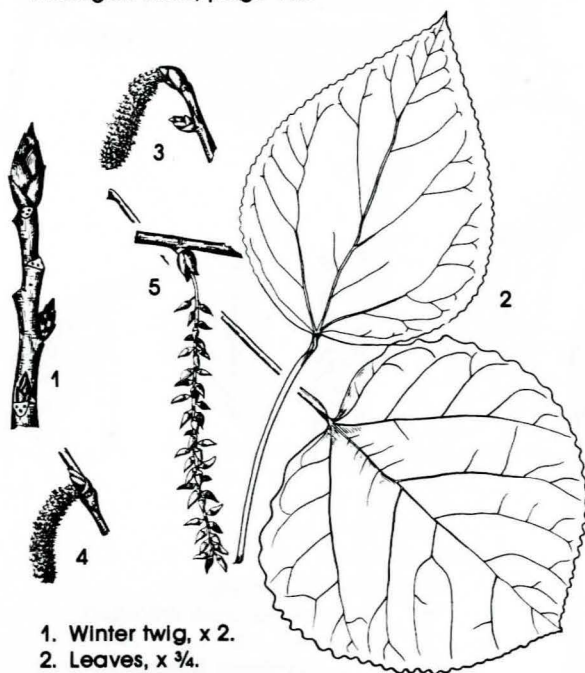
Bark: Smooth; green-white to cream colored; becomes furrowed on older trunks.

Wood: Important; heartwood gray-white to light gray-brown; sapwood lighter and merges gradually into heartwood; straight grained; fine textured; growth rings unclear; diffuse-porous; used for lumber, pallets, crates, pulp, and matches.

General: Native to northern Nebraska and most of northern and western U.S. and Canada. Often regenerates through root sprouts. Relatively short-lived. Very shade intolerant.



Illustrations from Barnes and Wagner: Michigan Trees, page 113.



Illustrations from Barnes and Wagner: Michigan Trees, page 121.

White Poplar (*Populus alba*)

Leaves: Alternate; simple; resembles a maple leaf in shape with very coarse teeth or lobes on margin; base rounded; 1" to 4" long; dark green and glabrous above; **white and woolly below**; petioles hairy, 1/2" to 1-1/2" long, **not flattened laterally**.

Twigs: Slender; green-gray; covered with fine white hairs. Terminal bud more or less woolly.

Fruit: A small capsule in necklace-like strings; seeds very small; capsules contain a large amount of cottony material in addition to seeds; dioecious.

Bark: **Green-white to bright white**; with dark cracks and ridges when older; very characteristic.

Wood: Little information published; similar to other poplars; diffuse-porous.

General: Native to Europe (not Nebraska). Often wrongly called silver maple. A large tree, grows rapidly in favorable locations, also thrives under less favorable conditions. Many root suckers (sprouts) occur around the tree. Very shade intolerant.

Other Poplars:

(All have alternate, deciduous leaves)

Narrowleaf Cottonwood (*Populus angustifolia*)

Leaves: **Lanceolate to ovate-lanceolate**; 2" to 4" long, 1/2" to 1-1/2" wide; petiole short (less than 1/3 length of blade) and **not flattened laterally**.

General: Native in western Panhandle of Nebraska, and throughout most of the Rocky Mountains from Mexico to southern Canada. Uncommon in Nebraska.

Lanceleaf Cottonwood (*Populus x acuminata*)

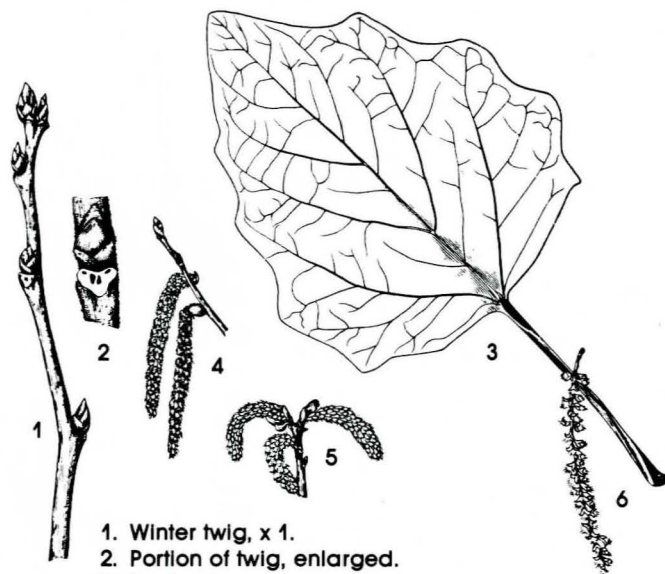
Leaves: Similar in size to narrowleaf cottonwood; **rhombic to lanceolate**; petiole 1" to 3" long, **not flattened laterally**.

General: Native to Scotts Bluff County, Nebraska, and throughout Rocky Mountains. Uncommon in Nebraska. Thought to be a hybrid between eastern cottonwood and narrowleaf cottonwood.

Balsam Poplar (*Populus balsamifera*)

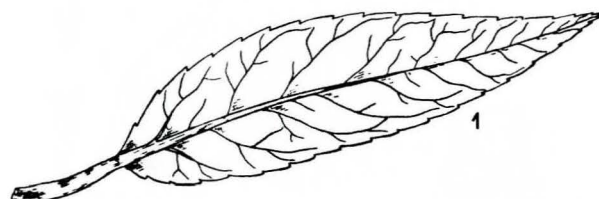
Leaves: Ovate to lanceolate; 3" to 6" long, 2" to 4" wide; pointed tip; rounded base; finely serrate margin; **dark green above, paler below**; **petiole round**, slender, long.

General: Native to extreme western Nebraska, northern Rocky Mountains, most of northeastern U.S., and most of Canada. Uncommon in Nebraska.



1. Winter twig, x 1.
2. Portion of twig, enlarged.
3. Leaf, x 1.
4. Male flowering catkins, x 1/2.
5. Female flowering catkins, x 1/2.
6. Fruiting catkin with open capsules, x 1/2.

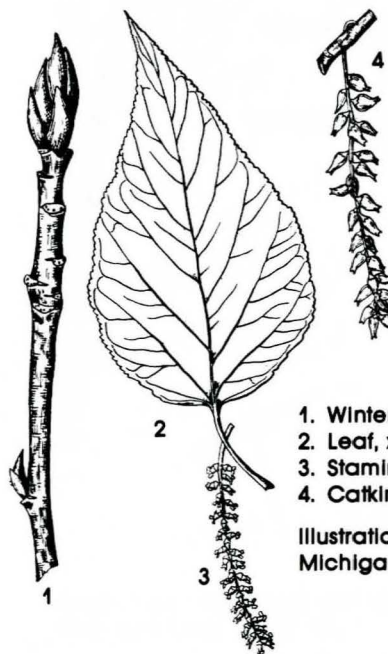
Illustrations from Barnes and Wagner:
Michigan Trees, page 117.



1. Leaf, x 1.



1. Leaf, x 1.



1. Winter twig, x 1.
2. Leaf, x 1/4.
3. Staminate flowering branchlet, x 1/2.
4. Catkin of pistillate flower, x 1/2.

Illustrations from Otis:
Michigan Trees, page 123.

Lombardy Poplar (*Populus nigra* var. *italica*)

****See also *Eastern Cottonwood* description and illustrations****

Leaves: Similar to eastern cottonwood.

General: Native to western Asia and eastern Europe (not Nebraska). A sterile clone of *P. nigra*. Once a popular shade tree in Nebraska because of its **narrow crown and upright form**. Weakens and dies quickly (within 5 to 15 years), however, due to stem cankers. Grows fast, short-lived.

JUGLANDACEAE—Walnut family. Contains 6-7 genera and 60 species. Widely distributed through the temperate forests of the Northern Hemisphere. There are many valuable timber trees in this family. They also can be important food sources (nuts).

Black Walnut (*Juglans nigra*)

Leaves: Alternate; once pinnately compound; 1' to 2' long; with 15 to 23 leaflets; terminal leaflet often missing; leaflets 3" to 4" long, ovate-lanceolate, serrate margins, glabrous above, hairy below; light yellow-green; characteristic odor when crushed; rachis stout, usually hairy.

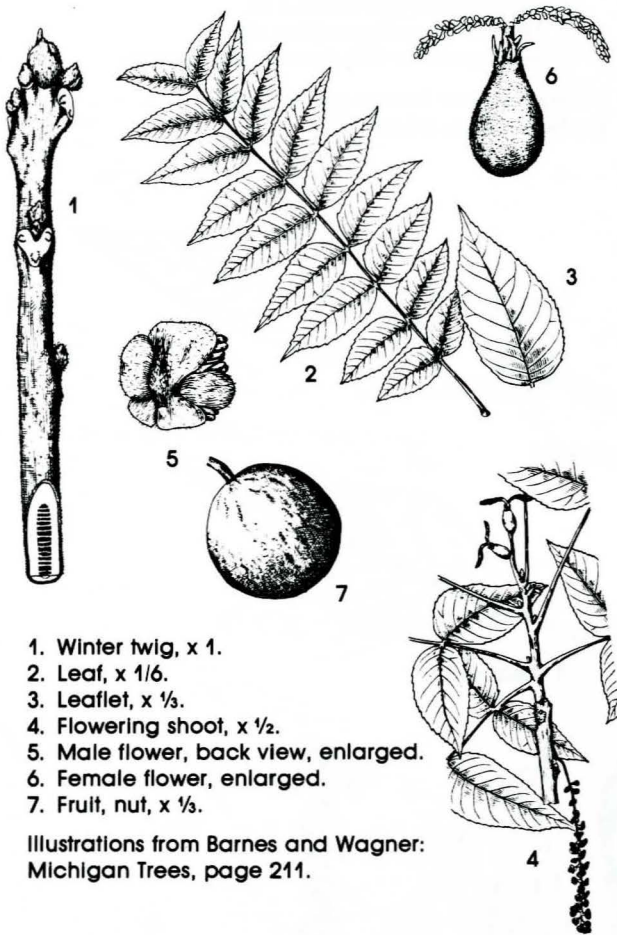
Twigs: Stout; light brown; **with yellow-brown to brown, chambered or divided pith**. Terminal bud short and blunt, larger than laterals, hairy; laterals much smaller, often with more than one at each leaf scar.

Fruit: 1-1/2" to 2" diameter; round; covered by a thick, glabrous, yellow-green, fleshy husk which becomes black and wrinkled; **nut inside with rough, dark, very hard shell**; sweet, oily, strong flavored nut meat within; monoecious.

Bark: Dark brown to gray-black; broken pieces showing chocolate-brown; intertwining ridges forming a diamond pattern.

Wood: Important; sapwood white to light brown; heartwood chestnut-brown; growth rings distinct; semi-ring-porous; rays indistinct; hard; strong; used for lumber, fine furniture, veneer; our highest-valued hardwood.

General: Native to Nebraska along the Missouri, Republican, and Niobrara Rivers, and across the eastern U.S. Has been planted throughout much of Nebraska. It prefers rich bottom soil and under favorable conditions attains a large size. Very shade intolerant.



1. Winter twig, x 1.
2. Leaf, x 1/6.
3. Leaflet, x 1/5.
4. Flowering shoot, x 1/2.
5. Male flower, back view, enlarged.
6. Female flower, enlarged.
7. Fruit, nut, x 1/5.

Illustrations from Barnes and Wagner:
Michigan Trees, page 211.

English Walnut * Persian Walnut (*Juglans regia*)

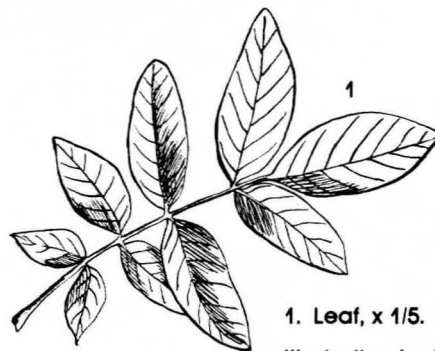
****See Black Walnut description and illustrations****

Major differences:

Leaves: With **5 to 9 leaflets with entire margins** (rarely 13); leaflets elliptic to obovate.

Fruit: Nut with **thinner, smoother shell** than black walnut; this is the most common commercially available walnut in the U.S.; monoecious.

General: Native to southeastern Europe to Himalayas and China (not Nebraska). Can be planted in eastern Nebraska in protected areas, but generally not cold hardy.



1. Leaf, x 1/5.

Illustration by Renee Lanik.

Shagbark Hickory (*Carya ovata*)

Leaves: Alternate; once pinnately compound; 8" to 14" long; usually 5 leaflets; terminal leaflet 5" to 8" long, side leaflets smaller, leaflets obovate to ovate-lanceolate, finely serrate margin; glabrous surfaced; rachis stout, grooved, glabrous.

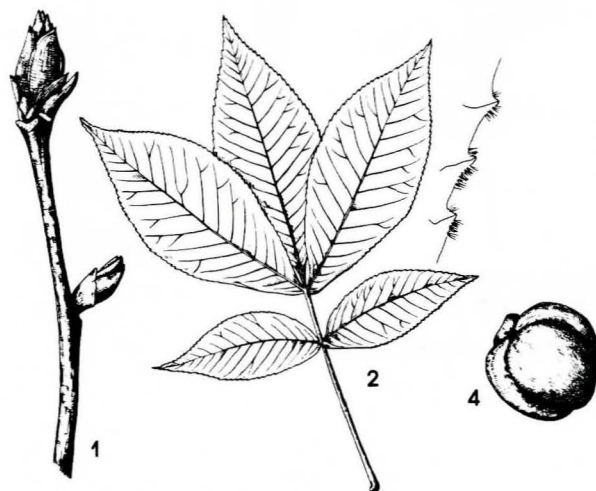
Twigs: Stout; gray to red-brown; more or less hairy. Terminal bud large, **with 4 overlapping, brown scales**.

Fruit: 1" to 2.5" long; with a 1/4" to 1/2" thick, 4 part husk; husk splits readily to release round nut; nut 4-ribbed with thick shell and sweet seed; monoecious.

Bark: Smooth and gray on young stems; breaking up into **thin, vertical plates that curve away from trunk**; shaggy appearance; very characteristic.

Wood: Important; sapwood white to light brown; heartwood pale brown to brown; growth rings distinct; ring-porous or semi-ring-porous; used for tool handles, etc.

General: Native to southeastern Nebraska and most of the eastern U.S. Typically found with oaks on upland sites. Slow growing. Intermediate shade tolerance.



1. Winter twig, x 3/4.

2. Leaf, x 1/4.

3. Flowering shoot, x 1/3.

4. Fruit, nut, x 1/3.

Illustrations from Barnes and Wagner: Michigan Trees, page 221.

Bitternut Hickory (*Carya cordiformis*)

Leaves: Alternate; once pinnately compound; 6" to 10" long; 7-11 leaflets; the terminal leaflet larger than the side leaflets, leaflets lanceolate or ovate-lanceolate to oblong-lanceolate, serrate margins; rachis slender, slightly grooved, hairy.

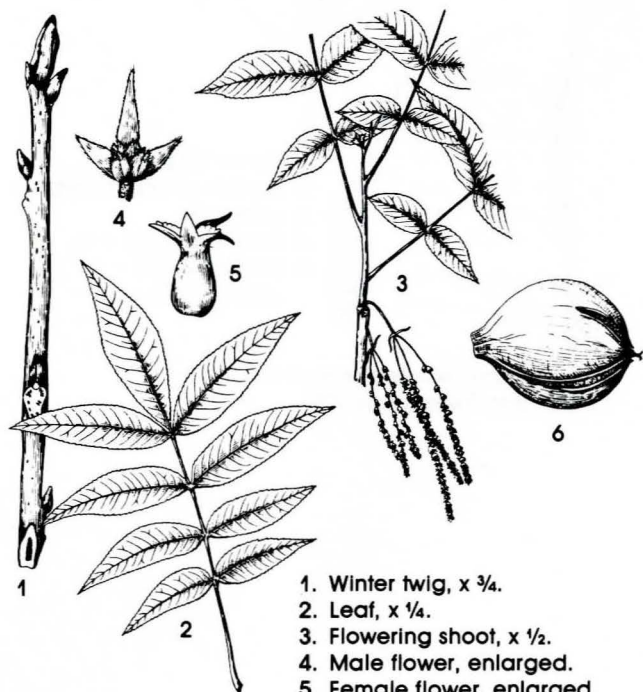
Twigs: Stout; green to gray-brown. Terminal bud present, 1/3" to 3/4" long, pointed, fine-hairy, **sulfur-yellow**.

Fruit: About 1" in diameter; **nearly round**; with a thin (1/8" or less) husk with 4 parts; husk splits readily to release round, bitter, thin-shelled nut; monoecious.

Bark: Firm; gray; smooth for many years; eventually having shallow, interlacing furrows.

Wood: Important; sapwood white or nearly white; darker heartwood; growth rings distinct; ring-porous; strong; hard; heavy; used for tool handles, charcoal, etc.

General: Native to eastern Nebraska and most of the eastern U.S. Slow growing. Occurs in mixed hardwood stands. Most common of the hickories. Intermediate shade tolerance.



1. Winter twig, x 3/4.

2. Leaf, x 1/4.

3. Flowering shoot, x 1/2.

4. Male flower, enlarged.

5. Female flower, enlarged.

6. Fruit, nut enclosed in husk, x 3/4.

Illustrations from Barnes and Wagner: Michigan Trees, page 215.



1. Leaf, x 1/5.
2. Winter twig, x 1/2.

Illustrations by Renee Lanik.

Pecan (*Carya illinoensis*)

Leaves: Alternate; once pinnately compound; 12" to 20" long; 9-17 leaflets, lanceolate to oblong-lanceolate, serrate margins; rachis slender, glabrous.

Twigs: Moderately stout; reddish-brown. Terminal bud present, 1/4" to 1/2" long, yellow-brown.

Fruit: 1" to 2.5" long; **twice as long as wide**; with a thin, green turning dark brown, 4 part husk; husk splits readily to release oblong nut; nut smooth or slightly 4-ridged, with thin to medium-thick shell and sweet seed; monoecious.

Bark: Light brown to brownish-gray; smooth when young breaking into scaly ridges.

Wood: Similar to bitternut hickory.

General: Native throughout Mississippi River valley from eastern Iowa to Louisiana, west to eastern Kansas and central Texas (probably not Nebraska). Planted throughout the South. Medium growth rate. Occurs naturally as scattered trees on moist but well drained soils. Intermediate shade tolerance.

BETULACEAE—Birch family. Contains 6 genera and 100 species. Generally found only in cooler regions in the Northern Hemisphere.

Paper Birch (*Betula papyrifera*)

Leaves: Alternate; simple; 2" to 3" long; ovate to oval; doubly serrate margin; pointed tip; rounded base; glabrous; dark green above; light yellow-green below; petiole slender, 3/4" to 1" long.

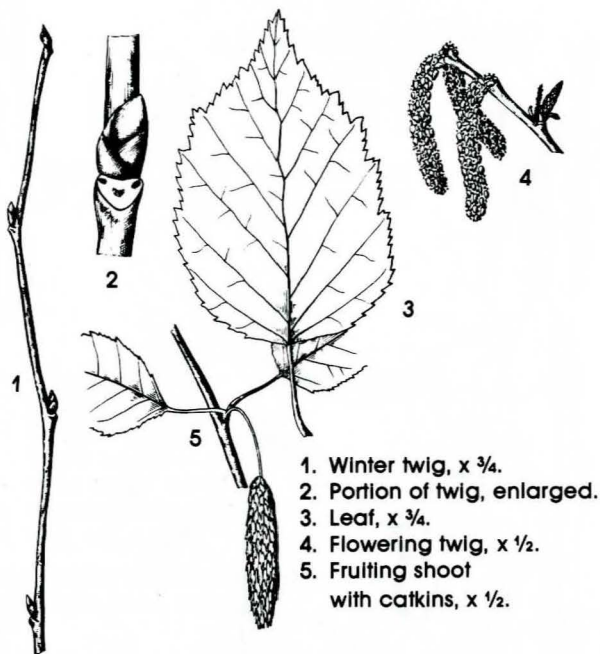
Twigs: Slender; dark orange-brown; glabrous to somewhat hairy; spur shoots on older growth. No terminal bud; lateral buds pointed, gummy, chestnut-brown.

Fruit: Cone-like; cylindrical; hangs down; 1" to 1-1/2" long; scaly; monoecious.

Bark: At first brown; **later becoming chalky-white, splitting horizontally into thin papery strips**, very characteristic; inner bark orange.

Wood: Moderately important; light colored wood; diffuse-porous; strong; used for pulp, lumber, fire-wood.

General: Native to northern Nebraska along Niobrara River, much of northern U.S., and Canada. Widely planted in Nebraska for ornamental purposes, but does poorly in east because of borers. Occurs naturally in moist areas, normally mixed with conifers. Shade intolerant. **European white birch** (*Betula pendula*) is planted in Nebraska and is often confused for paper birch because of its white bark. However, its bark does not peel as much as paper birch and its twigs are smoother (not hairy) and are often pendulous or "weeping" in appearance.



1. Winter twig, x 3/4.
2. Portion of twig, enlarged.
3. Leaf, x 3/4.
4. Flowering twig, x 1/2.
5. Fruiting shoot with catkins, x 1/2.

Illustrations from Barnes and Wagner:
Michigan Trees, page 229.

River Birch (*Betula nigra*)

Leaves: Alternate; simple; rhombic-ovate; doubly serrate margin; wedge-shaped base; tapering sides; petiole short, hairy.

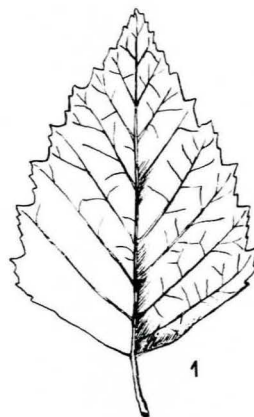
Twigs: Slender; red-brown; more or less hairy below. No terminal bud; lateral buds pointed.

Fruit: Cone-like; cylindrical; erect; hairy; with deciduous scales; monoecious.

Bark: Thin; **salmon-pink to red-brown; papery.**

Wood: Unimportant; sapwood white to yellow; heartwood brown; growth rings not distinct; diffuse-porous.

General: Native to eastern and southeastern U.S. (probably not Nebraska). Normally found along streams on cool, moist sites. Good alternative to paper birch in the landscape. Shade intolerant.



1. Leaf, x $\frac{3}{4}$.

Illustration by Renee Lanik

Water Birch (*Betula occidentalis*)

****See River Birch description and illustrations****

Major differences:

Leaves: **Rounded base**, ovate; more like paper birch than river birch.

Fruit: Sometimes pendent (hangs down); monoecious.

Bark: Similar in color to river birch, but **not papery.**

General: Native to western U.S., including Sioux County in Nebraska along canyon streams in the Pine Ridge. Usually a small tree, occasionally up to 30-40' tall, though generally smaller and shrubby in Nebraska.

Eastern Hophornbeam * Ironwood (*Ostrya virginiana*)

Leaves: Alternate; simple; oblong-ovate; 3" to 5" long; sharply, doubly serrate margin; thin; dark green above; paler and somewhat hairy below; petiole short, hairy.

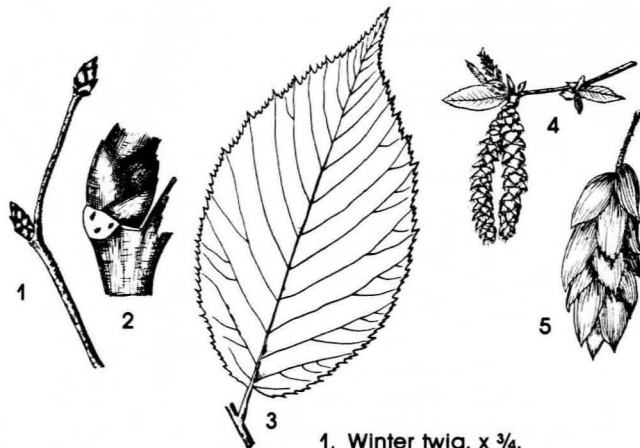
Twigs: Slender; red-brown to dark brown. No terminal bud; lateral buds pointed, scales with green bases and brown tips.

Fruit: Small nut; enclosed in an oval, flattened, papery sac; **sacs arranged in cone-like clusters, with the appearance of hops;** monoecious.

Bark: Thin; gray-brown; with small, shreddy plates.

Wood: Extremely hard and tough, so often called "ironwood"; resembles hickory; diffuse-porous; little used.

General: Native to eastern Nebraska and along the Niobrara River, and in much of the eastern U.S. Typically found on dry slopes. Slow growing. Shade tolerant.



1. Winter twig, x $\frac{3}{4}$.

2. Portion of twig, enlarged.

3. Leaf, x $\frac{1}{2}$.

4. Flowering shoot, x $\frac{1}{3}$.

5. Fruit, x $\frac{1}{3}$.

Illustrations from Barnes and Wagner:
Michigan Trees, page 235.



1. Winter twig, x 1.
2. Leaf, x 1/2.
3. Flowering shoots, x 1/2.
4. Prickly bur, opened, x 1/2.
5. Nut, x 1/2.

Illustrations Michigan Trees, page 259.

FAGACEAE—Beech family. Contains 6 genera and about 600 species. Widely distributed in both hemispheres, but most common in northern temperate forests. Many very important lumber producing trees.

American Chestnut (*Castanea dentata*)

Leaves: Alternate; simple; oblong-lanceolate; 5-1/2" to 8" long, 2" wide; coarsely and sharply serrate margin with bristle or hair tipped teeth; thin; yellow-green; glabrous; petiole 1/2" long.

Twigs: Stout; brown; glabrous and somewhat shiny. No terminal bud; lateral buds 1/4" long, brown, with 2 or 3 scales.

Fruit: 2" to 2-1/2" diameter bur, splits at maturity into 2 to 4 sections, covered with sharp, branched spines; bur encloses 2 to 3 edible nuts, 1/2" to 1" wide; monoecious.

Bark: Thick; dark brown to gray-brown; furrowed into broad, flat ridges.

Wood: Important before species was nearly wiped out by chestnut blight; sapwood narrow and almost white; heartwood gray-brown to brown and darker with age; growth rings very distinct; ring-porous; soft; durable; rot resistant; used for furniture, poles, posts, ties.

General: Native to the eastern U.S. in the Ohio valley, Appalachians, and northeast (not Nebraska). Now nearly extinct in its native range because of chestnut blight, a disease introduced to the U.S. in the early 1900's. Occasionally planted in eastern Nebraska and seems to do quite well, perhaps because of isolation from the disease. Intermediate shade tolerance.

Chinese Chestnut (*Castanea mollissima*)

****See American Chestnut description and illustrations****

Major differences:

Leaves: Elliptic-oblong to oblong-lanceolate; **whitish to greenish soft hair beneath.**

Twigs: **Hairy.** Buds 1/8" long or less.

General: Native to northern China and Korea (not Nebraska). Can be planted in eastern Nebraska and is resistant (not immune) to chestnut blight.

Bur Oak * Mossycup Oak (*Quercus macrocarpa*)

Leaves: Alternate; simple; oblong to obovate; 6" to 10" long, 3" to 5" wide; margin with 5 to 9 **rounded lobes**; variable shape; dark green and glabrous above; pale and hairy below; petiole 1" long, hairy.

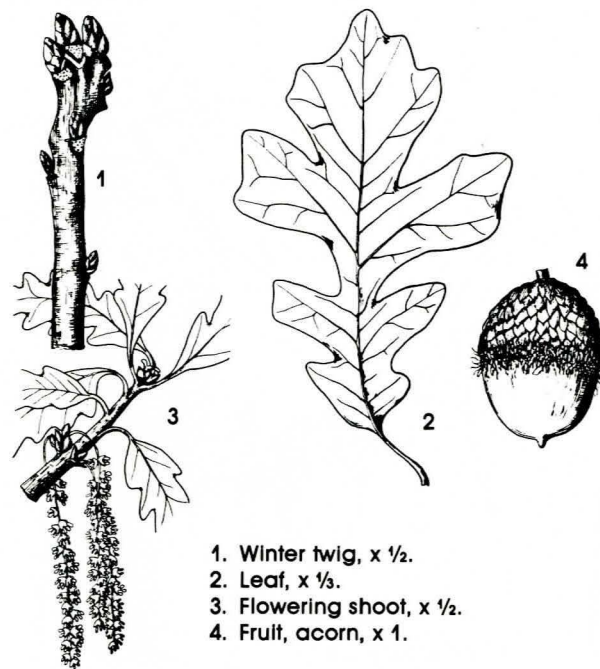
Twigs: Stout; yellow-brown; becoming ashen or brown; hairy; often with corky ridges. Terminal buds clustered at end of twig, blunt; lateral buds smaller.

Fruit: Acorn; short-stalked; about 1" long (2" in Texas); **1/2 or more enclosed by fringed cap**; matures in one season; monoecious.

Bark: Thick; gray-brown; deeply furrowed and ridged.

Wood: Important; sapwood white to light brown; heartwood light to dark brown; growth rings very distinct; ring-porous; rays visible to naked eye; pores normally filled by hardened bubbles; used for lumber, furniture, barrels, etc.

General: Native to eastern half of Nebraska and the eastern U.S. except for the extreme southeast. An important tree species in Nebraska, where it occurs on the edge of the prairie. It is long lived and drought tolerant. Valuable as an ornamental. Intermediate shade tolerance.



Illustrations from Barnes and Wagner:
Michigan Trees, page 271.

Chinkapin Oak (*Quercus muehlenbergii*)

Leaves: Alternate; simple; obovate to oblong-lanceolate; 4" to 7" long; **coarsely serrate margin with sharp teeth**; thick; glabrous, yellow-green above; paler and hairy below; petiole 1" to 1-1/4" long.

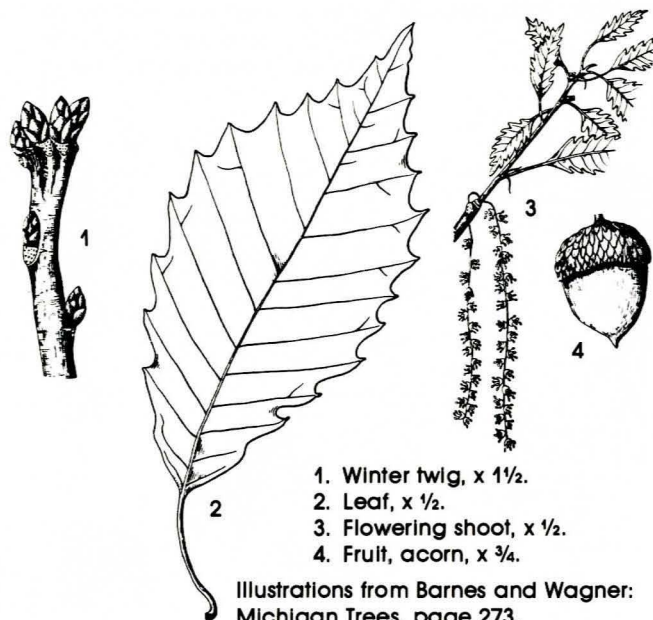
Twigs: Slender; orange-brown. Terminal buds small, clustered, orange-brown.

Fruit: Acorn; short-stalked; 1/2" to 3/4" long, chestnut-brown to dark brown; **shallow cap with hairy scales encloses 1/2 of the acorn**; matures in one season; monoecious.

Bark: Ash-gray; roughly furrowed or scaly.

Wood: Moderately important; similar to bur oak with similar uses but less common.

General: Native to extreme southeast Nebraska and most of the eastern U.S. Found in Nebraska mostly on dry, wooded sites near the Missouri River. Not planted much but worth trying. Intermediate shade tolerance.



Illustrations from Barnes and Wagner:
Michigan Trees, page 273.

Dwarf Chinkapin Oak (*Quercus prinoides*)

****See Chinkapin Oak description and illustrations****

Major differences:

Leaves: 2-1/2" to 5" long.

General: Native to much of eastern U.S., including extreme southeast Nebraska near the Missouri River. Generally tends to be shrubby or a small tree with a **spreading growth habit**. Has been observed along tops of Missouri River bluffs in Indian Caves State Park in Richardson County.



1. Winter twig, x 1.
2. Leaf, x 1/3.
3. Flowering shoot, x 1/2.
4. Fruit, acorn, x 1.

Illustrations from Barnes and Wagner:
Michigan Trees, page 267.

White Oak (*Quercus alba*)

Leaves: Alternate; simple; oblong to obovate; 5" to 9" long, 2" to 4" wide; margin with 7 to 9 **rounded lobes**; deep to shallow areas between lobes; bright green and glabrous above; paler below; turns brown to deep red in fall; petiole 1" long.

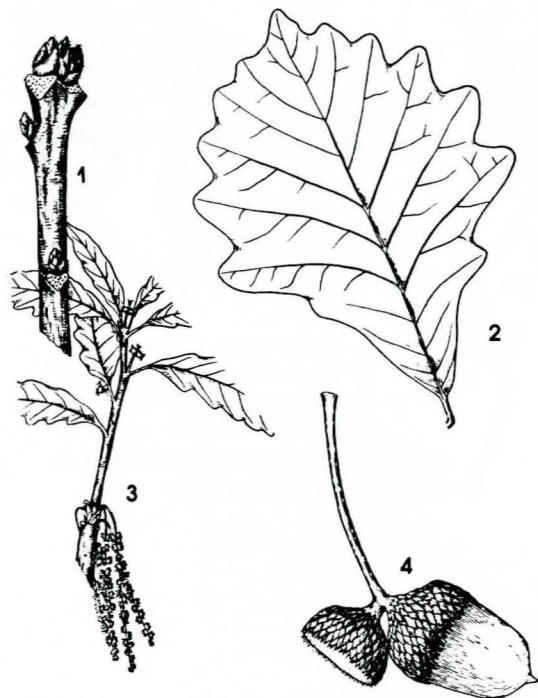
Twigs: Moderately stout; purple-gray to green-red; without corky ridges. Terminal buds 1/8" to 3/16" long, round to oval, clustered at end of twig; red-brown, glabrous; lateral buds similar but smaller.

Fruit: Acorn; no stalk or short-stalked; 1/2" to 3/4" long; **cap with warty scales covers 1/4 of the acorn**; matures in one season; monoecious.

Bark: Light ash-gray; variable; young to medium-sized trees with chunky, vertical blocks, older trees with scaly plates attached at one side.

Wood: Very important; sapwood white to light brown; heartwood gray-brown; growth rings very distinct; ring-porous; rays visible to naked eye; pores normally filled by hardened bubbles; used for lumber, furniture, floors, barrels, etc.

General: Native to extreme southeastern Nebraska and the eastern U.S. It is long lived and drought tolerant. White oak leaves often resemble bur oak leaves, but acorns are very different. Good as an ornamental. Intermediate shade tolerance.



1. Winter twig, x 2.
2. Leaf, x 1/2.
3. Flowering branchlet, x 1/2.
4. Fruit, x 1.

Illustrations from Otis:
Michigan Trees, page 269.

Swamp White Oak (*Quercus bicolor*)

Leaves: Alternate; simple; obovate; 5" to 7" long, 2" to 4" wide; shallowly lobed to coarsely serrate margin, teeth rounded; dark green and glossy above; paler and hairy to woolly below; petiole 1/2" to 3/4" long.

Twigs: Slender to moderately stout; brown; **bark peeling into curly, papery scales on older twigs**. Terminal buds 1/16" to 1/8" long, round, clustered at end of twig; red-brown, glabrous; lateral buds similar.

Fruit: Acorn; **1" to 4" long stalk**; 3/4" to 1-1/4" long, light brown; cap hairy, fringed, covers 1/3 of the acorn; matures in one season; monoecious.

Bark: Thick; dark brown; deeply furrowed into flat scaly ridges or blocks; peeling into curly, papery scales on older twigs.

Wood: Moderately important; similar to white oak.

General: Native to northern half of the eastern U.S. (probably not Nebraska). Naturally found on moist or low lying sites. Good as an ornamental tree and does well in eastern Nebraska. Intermediate shade tolerance.

Northern Red Oak (*Quercus rubra*)

Leaves: Alternate; simple; oblong to obovate; 5" to 8" long, 4" to 5" wide; 7 to 11, **coarse-serrate, pointed lobes on margin**; dark green, glabrous, **and lustrous to dull above**; paler beneath but with occasional small tufts of hair where veins meet; petiole 1" to 2" long, yellowish, glabrous.

Twigs: Moderately stout; red-brown to green-brown. Terminal buds 1/4" long, clustered, pointed, with many red-brown scales; lateral buds smaller.

Fruit: Acorn; 1" long, red-brown, inner surface of nut shell woolly; cap shallow, saucer-shaped, usually covering only the base of the nut; matures in two seasons; monoecious.

Bark: Smooth on young stems; eventually brown to nearly black with shallow furrows and wide, flat-topped ridges.

Wood: Very important; sapwood white to pale, red-brown; heartwood pink to light red-brown; growth rings very distinct; ring-porous; rays conspicuous to naked eye; valuable wood used for flooring, cabinets, and furniture.

General: Native to eastern Nebraska and most of the eastern U.S. Makes an attractive ornamental tree without chlorosis problems of pin oak. Good red fall color. Usually found naturally on fairly good sites. Intermediate shade tolerance.



1. Winter leaf, x 1.
2. Leaf, x 1/2.
3. Flowering shoot, x 1/2.
4. Fruit, acorn, x 1.

Illustrations from Barnes and Wagner:
Michigan Trees, page 277.
Illustration 4 by Renee Lanik.

Black Oak (*Quercus velutina*)

Leaves: Alternate; simple; obovate to ovate; 5" to 7" long, 3" to 5" wide; margin with **5 to 7 pointed lobes**; dark green and very glossy above; yellow-green to somewhat copper colored below, glabrous to hairy, with obvious tufts of hair where veins meet; petiole 1" to 2-1/2" long.

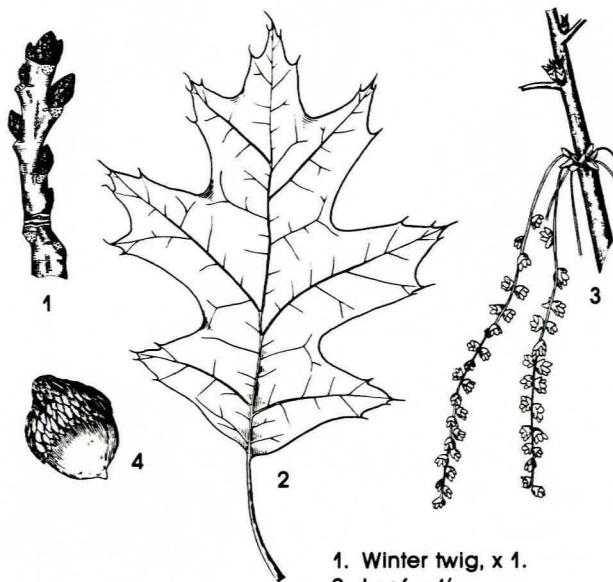
Twigs: Stout; red-brown; glabrous. Terminal buds 1/4" long, pointed, angled, gray and woolly; lateral buds smaller.

Fruit: Acorn; essentially no stalk; nut oval, 1/2" to 3/4" long, red-brown; cap with thin, loose, hairy, pointed scales encloses 1/4 to 1/3 of acorn; matures in two seasons; monoecious.

Bark: Thick; nearly black on old stems; deeply furrowed vertically with many horizontal breaks; inner bark orange-yellow.

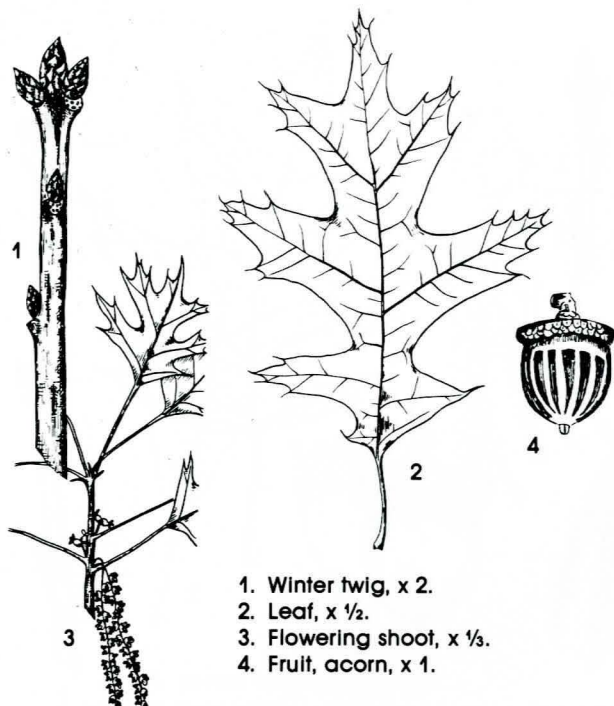
Wood: Important; similar to northern red oak.

General: Native to extreme southeast Nebraska and most of eastern U.S. Generally found naturally on poor to good, upland sites. Intermediate shade tolerance.



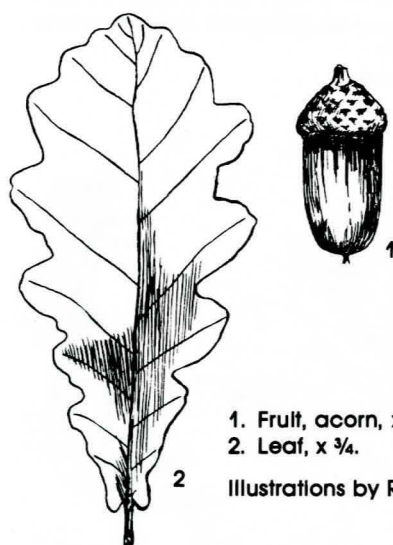
1. Winter twig, x 1.
2. Leaf, x 1/2.
3. Flowering shoot, x 1/2.
4. Fruit, acorn, x 3/4.

Illustrations from Barnes and Wagner:
Michigan Trees, page 279.



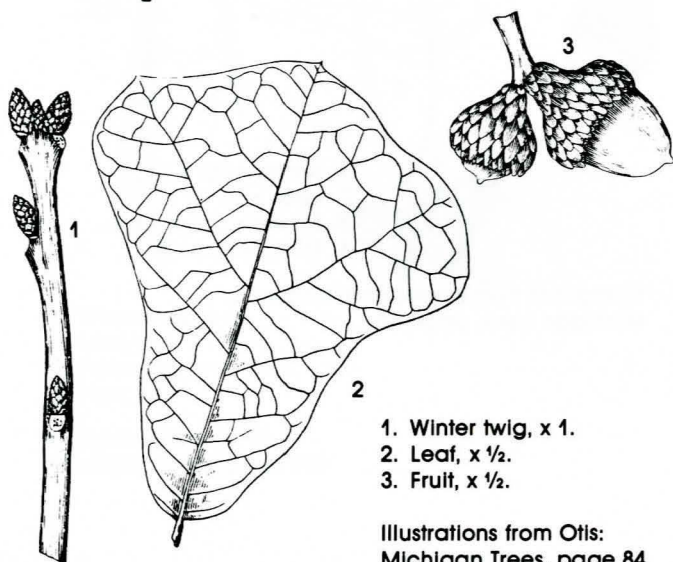
1. Winter twig, x 2.
2. Leaf, x 1/2.
3. Flowering shoot, x 1/3.
4. Fruit, acorn, x 1.

Illustrations 1,2,3 from Barnes and Wagner:
Michigan Trees, page 285.
Illustration 4 by Renee Lanik.



1. Fruit, acorn, x 1/2.
2. Leaf, x 3/4.

Illustrations by Renee Lanik.



1. Winter twig, x 1.
2. Leaf, x 1/2.
3. Fruit, x 1/2.

Illustrations from Otis:
Michigan Trees, page 84

Pin Oak (*Quercus palustris*)

Leaves: Alternate; simple; obovate to broadly oval; 3" to 5" long, 2" to 5" wide; margin with 5, less commonly 7 to 9 lobes; **openings between lobes extending 2/3 or more to the midrib**; lobes bristle-tipped; bright green and glabrous above; paler below; petiole up to 2" long, slender.

Twigs: Slender; red-brown. Terminal buds clustered, 1/8" long, oval, with red-brown scales; lateral buds similar but smaller.

Fruit: Acorn; 1/2" long, light brown, **often striped**, nearly hemispherical; thin, saucer-like cap encloses acorn only at the base; matures in two seasons; monoecious.

Bark: Thick; gray-brown; smooth for many years; eventually with low, scaly ridges.

Wood: Important; similar to northern red oak.

General: Native to east-central U.S. (not Nebraska). Widely planted in Nebraska as an ornamental, but suffers from iron chlorosis. Shade intolerant.

Other Oaks:

(All have alternate, simple leaves and clustered terminal buds)

English Oak (*Quercus robur*)

****See also White Oak description and illustrations****

Leaves: Like white oak's but **smaller, 2-1/2" to 5" long; ear-lobe-like leaf base**; short petiole.

Fruit: Acorn; **1" to 3" long stalk**; nut 1" to 2" long; cap covering 1/3 of acorn; monoecious.

General: Native to Europe, northern Africa, and western Asia (not Nebraska). Not planted much in Nebraska but will do well in the eastern part of the state.

Blackjack Oak (*Quercus marilandica*)

****See also Black Oak description and illustrations****

Leaves: 5" to 7" long; variable shaped but usually obovate with the margin shallowly three-lobed near the apex; **dark green and glossy above; tan colored and hairy to scaly below; leathery.**

Fruit: Acorn; very short stalk to no stalk; nut 3/4" long, yellow-brown; kernel yellow; cap with large, loose, red-brown, hairy scales, encloses 1/2 of acorn; monoecious.

Bark: Black; **very rough and blocky.**

General: Native to eastern U.S. south of New York and Michigan and extending west to the Great Plains; native trees reported in extreme southeast Nebraska. Very tough, drought tolerant tree. Moderately shade intolerant.

Scarlet Oak (*Quercus coccinea*)

****See also Pin Oak and Black Oak descriptions and illustrations****

Leaves: 3" to 7" long; ovate, obovate or oval; margin deeply 5 to 9 lobed with wide, circular openings between lobes; bright glossy green above, paler below and hairless except for tufts of hair where veins meet.

Fruit: Acorn; very short stalk to no stalk; **1/2" to 1" long**, red-brown, **often has concentric rings near the tip**; cap with tight, glossy scales encloses 1/2 or less of acorn; monoecious.

General: Native to most of the eastern U.S. except the south Atlantic and Gulf Coastal Plains (not Nebraska). Can be used in the landscape in eastern Nebraska, but hard to find in nurseries. Nice scarlet fall color.

Shingle Oak (*Quercus imbricaria*)

Leaves: Oblong to elliptic; 4" to 6" long, 1" to 3" wide; **entire margin with no lobes**; dark green, glabrous, and glossy above; pale to brown and hairy below.

Fruit: Acorn; short stalked; 1/2" to 3/4" long; chestnut-brown; enclosed for 1/3 to 1/2 of its length in a bowl shaped, red-brown, glossy cap; monoecious.

General: Native to the Appalachian region, and Ohio River and central Mississippi River valleys, possibly including the extreme southeast corner of Nebraska. Occasionally planted in eastern Nebraska.

ULMACEAE—Elm family. Contains 15 genera and more than 150 species. Widely distributed throughout the temperate regions of the world.

American Elm * White Elm (*Ulmus americana*)

Leaves: Alternate; simple; oblong-obovate to elliptic; 4" to 6" long, 1" to 3" wide; coarsely doubly serrate margin; dark green and **glabrous or slightly rough above**; pale and glabrous or somewhat hairy below; unequal base; petiole very short.

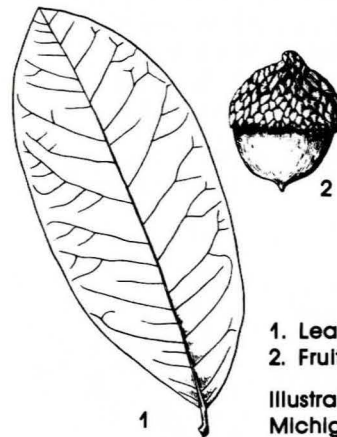
Twigs: Slender; zigzag; generally glabrous; brown. No terminal bud; lateral buds about 1/4" long, oval, not sharp-pointed, chestnut-brown.

Fruit: Samara; about 1/2" long; oval; a flat thin wing around the seed, wing hairy-fringed and **notched at tip**; **seed cavity distinct**; ripens in spring; perfect flowers.

Bark: Ash-gray; divided into flat-topped ridges with diamond-shaped furrows in between; on older trees can become rough and without a definite pattern; **a broken piece of outer bark will have alternating light and dark layers**.

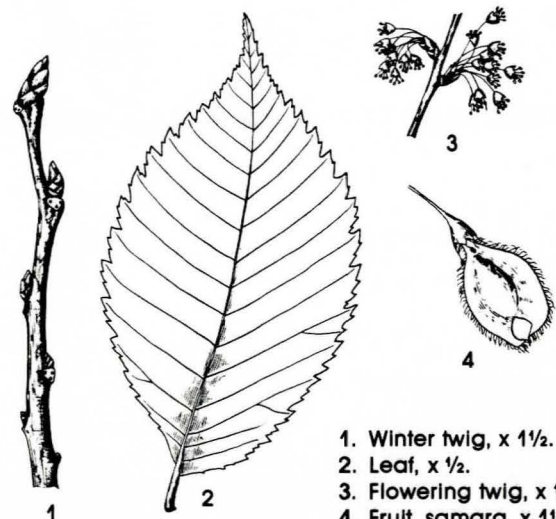
Wood: Important; sapwood gray to light brown; heartwood light brown to brown; growth rings distinct; ring-porous; rays not distinct to naked eye; used for boxes, crates, furniture, and veneer.

General: Native to most of Nebraska and the eastern U.S. Formerly widely planted as a street tree but has been largely wiped out by Dutch elm disease. Intermediate shade tolerance.



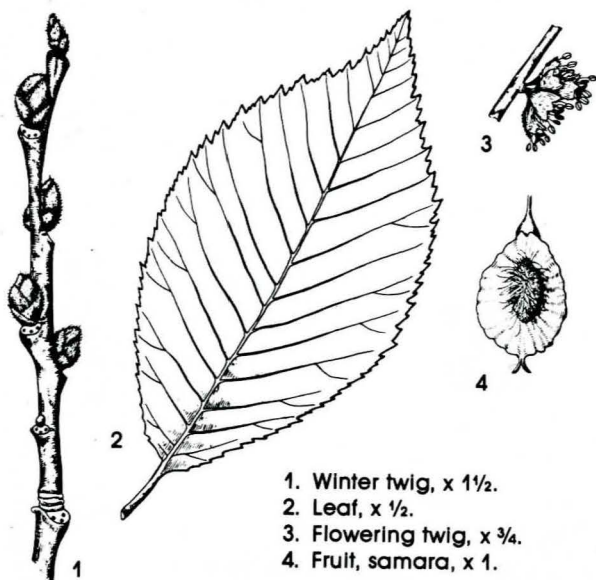
1. Leaf, x 1/2.
2. Fruit, x 1.

Illustrations from Otis:
Michigan Trees, page 281.



1. Winter twig, x 1 1/2.
2. Leaf, x 1/2.
3. Flowering twig, x 1/2.
4. Fruit, samara, x 1 1/2.

Illustrations from Barnes and Wagner:
Michigan Trees, page 245.



Illustrations from Barnes and Wagner:
Michigan Trees, page 249.

Slippery Elm * Red Elm (*Ulmus rubra*)

Leaves: Alternate; simple; elliptic to obovate; 5" to 7" long, 2" to 3" wide; oval; coarsely doubly serrate margin; base uneven; **very rough textured above**; soft and hairy below; petiole very short.

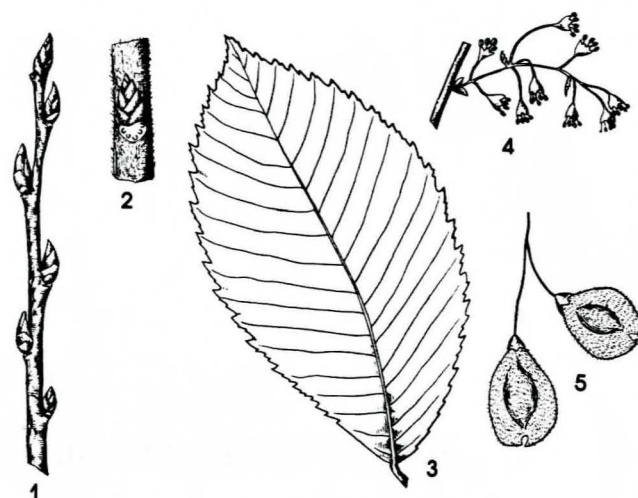
Twigs: Stouter than American elm; ash-gray; rough. No terminal bud; lateral buds 1/4" long, nearly black, hairy.

Fruit: Samara; about 3/4" long; oval; a flat thin wing around the seed, wing surface glabrous and margin entire, **no notch or slightly notched at tip**; **seed cavity distinct**; ripens in spring; perfect flowers.

Bark: Dark red-brown; nearly parallel furrows, not diamond-shaped; **without alternating light and dark layers (brown layers only)**; inner bark slippery-wet and aromatic.

Wood: Similar to American elm.

General: Native to eastern Nebraska and the eastern U.S. Found naturally with mixed hardwoods. Inner bark was chewed by early woodsmen to quench the thirst and steeped in water as a remedy for fever. Intermediate shade tolerance.



1. Winter twig, x 1.
2. Portion of twig, enlarged.
3. Leaf, x 1.
4. Flowering branchlet, x 1.
5. Fruit, x 1.

Illustrations from Otis:
Michigan Trees, page 247.

Rock Elm * Cork Elm (*Ulmus thomasi*)

Leaves: Alternate, simple; obovate to elliptic; 2-1/2" to 4-1/2" long; 1-1/4 to 2-1/4" wide; oval; coarsely doubly serrate margin; base nearly equal; dark green, glabrous, and somewhat glossy above; paler and slightly hairy below; thick.

Twigs: Red-brown; glabrous, though may be slightly hairy when young; **developing corky wings after a year or two**; wings may not be present on twigs of very old trees. No terminal bud; lateral buds 1/4" long, brown, sharply pointed, downy.

Fruit: Samara; 3/4" to 1" long; a flat thin wing around the seed, wing surface hairy, wing margin slightly notched at tip; **seed cavity not distinct**; ripens in spring; perfect flowers.

Bark: Similar to American elm but darker and more deeply and irregularly furrowed; with alternating light and dark layers.

Wood: Similar to American elm but heavier and harder. High quality wood but little is available.

General: Native to eastern Nebraska and along the eastern portion of the Niobrara River valley and throughout the northern half of the eastern U.S. Found on varied sites, often mixed with other hardwoods. Intermediate shade tolerance.

Siberian Elm (*Ulmus pumila*)

Leaves: Alternate; simple; elliptic to elliptic-lanceolate; **1" to 3" long**, 1/3" to 1" wide; singly serrate margin; usually nearly equal at base; **dark green and glabrous above**; glabrous or slightly hairy below; petiole very short.

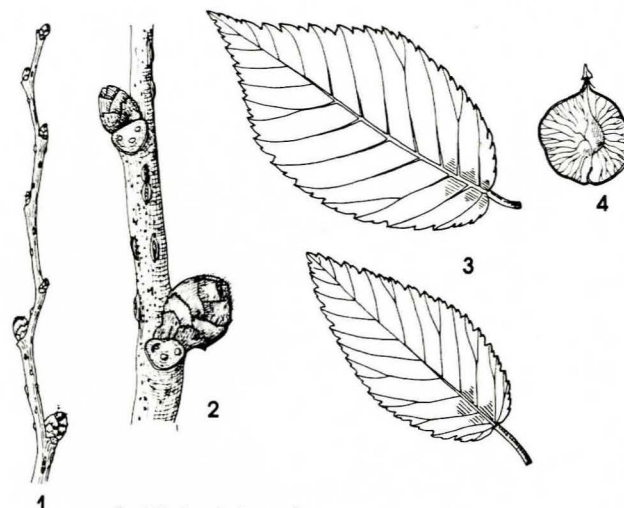
Twigs: Slender; gray; glabrous or slightly hairy. No terminal bud; lateral buds spherical, bud scales tipped with long hairs.

Fruit: Samara; 1/2" long; round; wing as in other elms, **wing margin deeply notched at tip**; **ripens in spring**; perfect flowers.

Bark: Gray; rough; with shallow furrows and long, flat ridges.

Wood: Little data published but similar to American elm.

General: Native to Siberia, China, and Korea (not Nebraska). Much planted throughout Nebraska in shelterbelts. Commonly, but incorrectly, called Chinese elm. Grows fast but has many undesirable features. Intermediate shade tolerance.



1. Winter twig, x 1.
2. Portion of twig: vegetative bud (above), flower bud (below), enlarged.
3. Leaves, x 1.
4. Fruit, samara, x 1.

Illustrations from Barnes and Wagner:
Michigan Trees, page 251.

Chinese Elm * Lacebark Elm (*Ulmus parvifolia*)

Leaves: Alternate; simple; elliptic to ovate or obovate; 3/4" to 2-1/2" long; singly serrate margin; unequal and rounded at base; dark green and glabrous above; hairy beneath when young; **leathery**.

Twigs: Slender; gray-brown; glabrous to slightly hairy. Buds small compared to other elms, 1/10" to 1/8" long; brown; slightly hairy.

Fruit: Samara; 1/3" long; oval; wing as in other elms, notched at tip; **ripens in fall**; perfect flowers.

Bark: Gray-green with orange and brown; **beautiful interlacing appearance, very characteristic**.

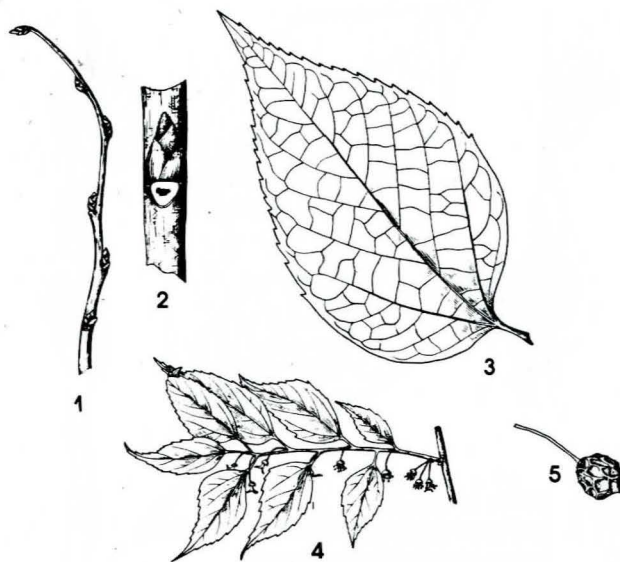
Wood: No data available.

General: Native to northern and central China, Korea, and Japan (not Nebraska). This is the true Chinese elm and is not the same as Siberian elm. This is a desirable landscape tree that can do well in eastern Nebraska.



1. Winter twig, x 1.
2. Leaf, x 1.

Illustrations by Renee Lanik.



1. Winter twig, x $\frac{3}{4}$.
2. Portion of twig, enlarged.
3. Leaf, x $\frac{2}{3}$.
4. Flowering shoot, x $\frac{1}{3}$.
5. Fruit, drupe, x 1.

Illustrations from Barnes and Wagner:
Michigan Trees, page 237.

Hackberry (*Celtis occidentalis*)

Leaves: Alternate; simple; ovate to ovate-lanceolate; 2" to 4" long; serrate margin; frequently with a long tapering tip; base uneven; glabrous or slightly rough above; glabrous below; light, dull green; "nipple galls" or green bumps often occur on underside of leaves; petiole up to 1/2" long.

Twigs: Slender; zigzag; red-brown. No terminal bud; lateral buds small, pointed, pressed against the twig.

Fruit: Drupe; 1/4" in diameter; round; **purple**; one per stem; on stalks 1/2" to 3/4" long; flesh edible; ripen in September or October; polygamo-monoecious.

Bark: Gray-brown; smooth when young; develops characteristic **corky warts or ridges when older**; eventually becomes scaly.

Wood: Moderately important; sapwood pale yellow to green-yellow; heartwood yellow to light brown; growth rings distinct; ring-porous; rays visible to the naked eye; often sold as elm.

General: Native to most of Nebraska and the eastern U.S., excluding the extreme southeast. Very common in Nebraska. A tough, durable, drought resistant tree often used in windbreaks. Intermediate shade tolerance.

MORACEAE—Mulberry family. Contains about 70 genera and over 1,500 species. Widely distributed around the world, especially in warmer areas. The **sap is milky** and in some species can be a source of rubber.

Red Mulberry (*Morus rubra*)

Leaves: Alternate; simple; nearly orbicular; 3" to 5" long; variable in shape; **no lobes or up to 3 to 5 lobes**; coarsely serrate margin; hairy beneath; petiole 1/2" to 1" long.

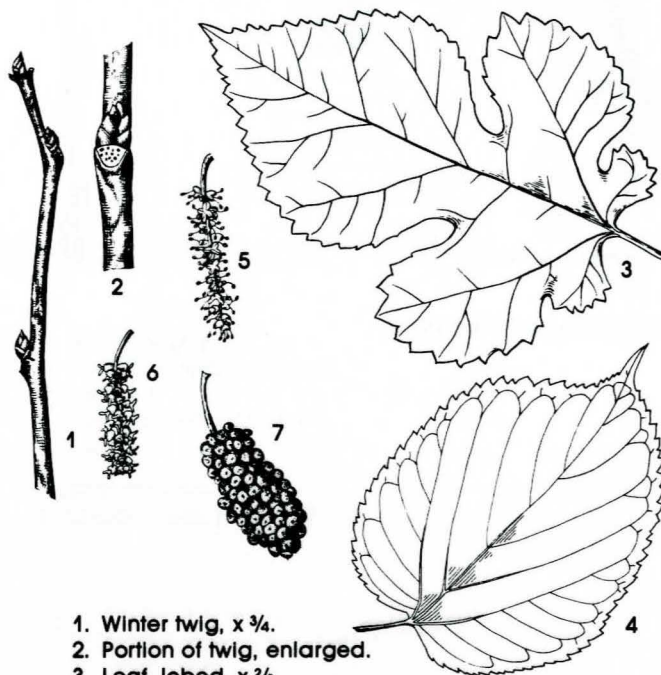
Twigs: Slender; somewhat zigzag; red-brown to green-brown; showing milky sap when cut. No terminal bud; lateral buds, ovoid, pointed, 1/4" long, light brown.

Fruit: **Multiple fruit of small drupes; resembles a blackberry**; dark purple or nearly black; 1/2" to 3/4" long; juicy; ripening in June or July; dioecious.

Bark: Thin; dark brown to orange-brown; scaly and furrowed; bark of roots yellow.

Wood: Sapwood yellow; heartwood yellow-brown; growth rings distinct; ring-porous; rays plainly visible to naked eye; little used.

General: Native to eastern Nebraska and most of the eastern U.S. Usually found on rich, moist sites. Shade tolerant. **White mulberry (*Morus alba*)**, a native of China, has been widely planted in the U.S. and now is naturalized over much of the country and can be found in Nebraska. Its leaves are similar to red mulberry's but its fruit is white to pinkish-purple when mature.



1. Winter twig, x $\frac{3}{4}$.
2. Portion of twig, enlarged.
3. Leaf, lobed, x $\frac{2}{3}$.
4. Leaf, unlobed, x $\frac{1}{2}$.
5. Catkin of male flowers, x $\frac{3}{4}$.
6. Catkin of female flowers, x $\frac{3}{4}$.
7. Fruit, multiple of drupes, x $\frac{3}{4}$.

Illustrations from Barnes and Wagner:
Michigan Trees, page 257.

Osage-orange (*Maclura pomifera*)

Leaves: Alternate; simple; oblong-lanceolate to ovate; 4" to 5" long; entire margin; with a narrow, pointed tip; dark green and glabrous above; milky juice; petiole 1/2" to 1-1/2" long.

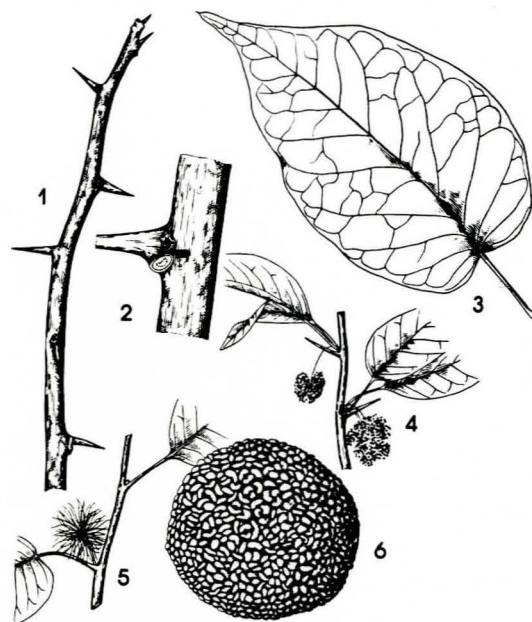
Twigs: Stout; orange-brown; hairy; **armed with stout, sharp-pointed thorns**. No terminal bud; lateral buds small, round, brown, partially imbedded in bark.

Fruit: A pale green, orange-like structure; 4" to 5" in diameter; containing a bitter, milky juice; becoming woody; dioecious.

Bark: Thin; dark orange-brown; furrowed with flat ridges.

Wood: Characteristic bright orange color; very hard and dense; ring-porous; yields a yellow dye; used to make bows, thus the tree is sometimes called "bois d'arc" (pronounced bodark) or "bow wood"; excellent firewood.

General: Native to Arkansas, Oklahoma, and Texas (not Nebraska). Was extensively planted as a hedge or windbreak by early Nebraska settlers. In Nebraska the usual height is less than 30 feet. Very tough tree. Shade intolerant.



1. Winter twig, x 1/4.
2. Portion of twig, enlarged.
3. Leaf, x 1/3.
4. Male flowering shoot, x 1/2.
5. Female flowering shoot, x 1/2.
6. Fruit, multiple of drupes, x 1/4.

Illustrations from Barnes and Wagner:
Michigan Trees, page 253.

MAGNOLIACEAE—Magnolia family. Contains 8 to 12 genera and about 210 species. Distributed throughout southeast Asia, the eastern U.S., central America, and the West Indies to eastern Brazil. Most have **large, conspicuous flowers**.

Cucumbertree * Cucumber Magnolia (*Magnolia acuminata*)

Leaves: Alternate; simple; broadly elliptic to ovate; 6" to 10" long; 4" to 6" wide; entire margin with pointed tip; yellow-green and glabrous above; paler and glabrous or slightly hairy below; thin; petiole 1" to 1-1/2" long.

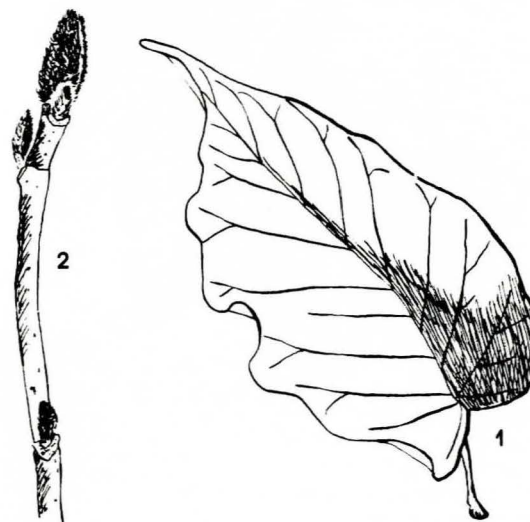
Twigs: Fairly stout; glossy; brown to red-brown; spicy odor when crushed. Terminal buds about 1/2" to 3/4" long, **covered with silvery, silky hairs**; lateral buds smaller.

Fruit: Aggregate; 2" to 3" long; held upright; seeds red, about 1/2" long, suspended from slender threads at maturity; perfect flowers.

Bark: Brown; furrowed into narrow flaky ridges.

Wood: Similar to yellow-poplar and mixed with that species when marketed.

General: Native to the Appalachian region and the lower Mississippi and Ohio River valleys (not Nebraska). Can be planted in eastern Nebraska. Fairly large tree. Has **2" to 3" long, non-showy, yellow-green flowers** that appear in May or June after the leaves are open. Shade intolerant.



1. Leaf, x 1/2.
2. Winter twig, x 1.

Illustrations by Renee Lanik.



1. Winter twig, x 3/4.
2. Leaf, x 1/5.

Illustrations by Renee Lanik.

Saucer Magnolia (*Magnolia x soulangiana*)

Leaves: Alternate; simple; obovate to broadly oblong; **3" to 6" across; 1-1/2" to 3" wide**; entire margin with pointed tip; glabrous; dark green above.

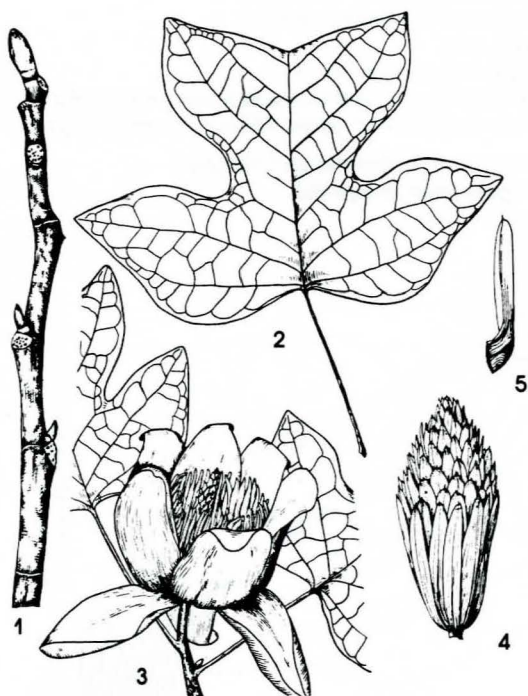
Twigs: Fairly stout; brown; glabrous; fragrant when crushed. Terminal buds 1/2" to 3/4" long, silky; lateral buds smaller.

Fruit: Aggregate; held upright; perfect flowers.

Bark: Gray on older trunks, usually smooth.

Wood: No data available.

General: This species is a hybrid of lily magnolia (*M. quinquepetala*) and Yulan magnolia (*M. heptapeta*), both natives of China. Does well throughout the eastern half of Nebraska. This is a **small, spreading tree**. It has **large (5" to 10")**, **showy, white to pink to purplish flowers** that open in spring before the leaves. Flower buds are sometimes injured by late frosts. Shade intolerant.



1. Winter twig, x 3/4.
2. Leaf, x 1/5.
3. Flowering shoot, x 1/5.
4. Fruit, aggregate of samaras, x 1/2.
5. Single samara, x 1/2.

Illustrations from Barnes and Wagner:
Michigan Trees, page 107.

Yellow-poplar * Tuliptree * Tulip-poplar (*Liriodendron tulipifera*)

Leaves: Alternate; simple; 4" to 6" across; **usually 4-lobed; leaf base and tip flat, leaf shape very distinctive**; entire margin; glabrous; petiole 2" to 4" long.

Twigs: Fairly stout; red-brown; pith divided into chambers. Terminal buds about 1/2" long, covered with 2 duck-bill like scales; lateral buds much smaller.

Fruit: An aggregate of deciduous samaras; 2-1/2" to 3" long; held upright; perfect flowers.

Bark: Dark green and smooth on young stems; becoming thick, ash-gray, furrowed, with rough ridges.

Wood: Very important; light yellow sapwood; light yellow to dark brown heartwood; even-textured; diffuse-porous; used for furniture, interior finish, boxes, pallets, crates, plywood, etc.

General: Native to southeast Missouri, the southeastern U.S., and as far northeast as Vermont (not Nebraska). Has **large, green-yellow flowers** that appear in May or June after the leaves are open. Not a true poplar. Shade intolerant.

HAMAMELIDACEAE—Witch-hazel family. Contains 23 genera and about 100 species of trees and shrubs. Found throughout the forested regions of eastern North America to Mexico and Central America; South Africa, Madagascar, Asia, and Australia. Several species have resins that are used in soaps, perfumes, and medicines.

Sweetgum * American Sweetgum (*Liquidambar styraciflua*)

Leaves: Alternate; simple; 6" to 7" wide; **star-shaped with 5 to 7 palmately arranged lobes**; finely serrate margins; bright green and glossy above; hairy where veins meet below; petioles long and slender.

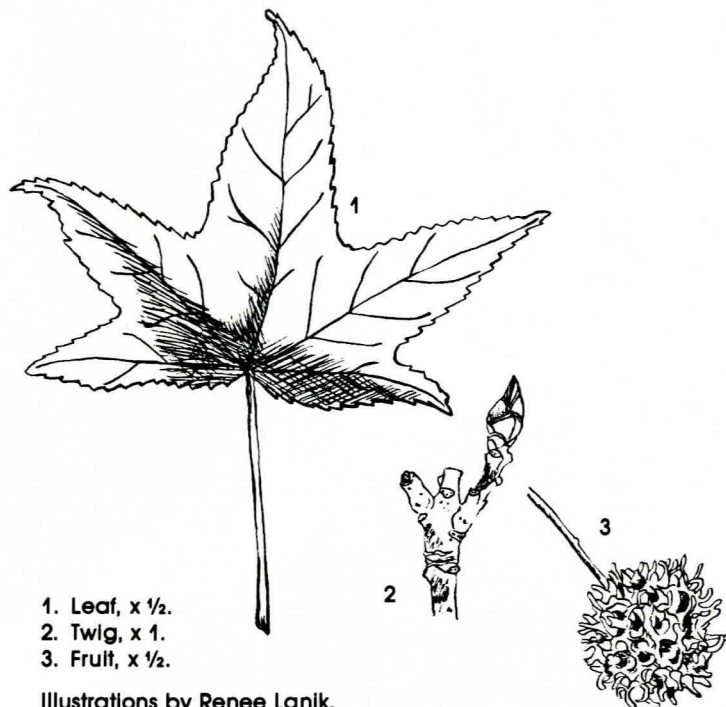
Twigs: Slender to stout; green to yellow-brown; round or slightly angled and **may develop corky wings**; glossy; pith star-shaped in cross-section. Terminal buds 1/4" to 1/2" long, with several orange-brown scales; lateral buds similar but smaller.

Fruit: A **globose head of 2-celled, beaked capsules**; 1" to 1-1/2" in diameter; woody; brown; held on a long, slender stalk; persists on trees into winter; monoecious.

Bark: Thick; gray-brown; deeply furrowed into narrow, tight ridges.

Wood: Very important; light colored sapwood; reddish-brown heartwood; moderately heavy, hard, and strong; diffuse-porous; used for lumber for furniture and boxes, veneer, railroad ties, and pulp.

General: Native to the southern two-thirds of the eastern U.S., extending west to southeastern Missouri, eastern Oklahoma, and eastern Texas (not Nebraska). Can be planted in eastern Nebraska but may winter kill; otherwise a desirable landscape tree with beautiful fall colors. Very shade intolerant.



1. Leaf, x 1/2.
2. Twig, x 1.
3. Fruit, x 1/2.

Illustrations by Renee Lanik.

PLATANACEAE—Sycamore family. Contains 1 genus and 7 to 10 species. Found in North America and southeastern Europe east to India.

American Sycamore * American Planetree (*Platanus occidentalis*)

Leaves: Alternate; simple; 3" to 8" wide; more or less deeply 3 to 5 lobed; margin of lobes coarsely serrate; bright green and glabrous above; paler and hairy along veins below; petioles 2" to 3" long, hollow at the base.

Twigs: Moderately slender; orange-brown; zigzag. No terminal bud; lateral buds conical, resinous, covered by a single cap-like scale and hidden under hollow petiole base.

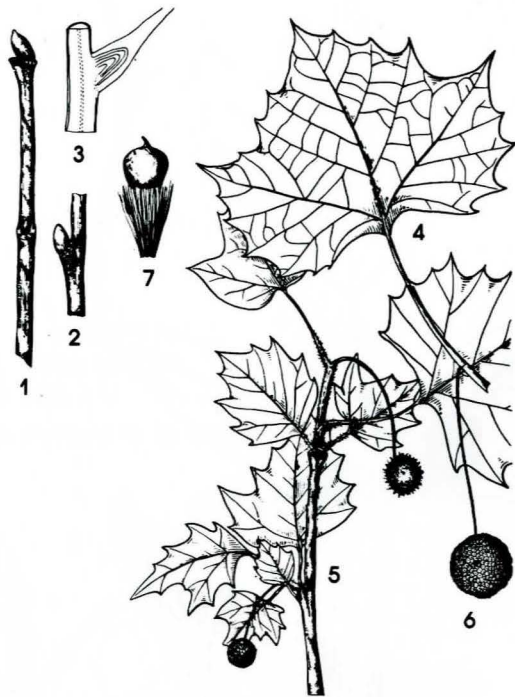
Fruit: Round, **yellow-brown head or ball** about 1" in diameter that hangs from slender, 3" to 6" long stem; heads usually occur singly; often persists through the winter; monoecious.

Bark: Brown on younger branches; soon becomes mottled (brown and white) as brown outer bark peels off, showing the **creamy-white, smooth inner bark**; bark on lower trunk of older trees brown and scaly; very distinctive.

Wood: Somewhat important; sapwood light yellow; heartwood light to dark brown; growth rings distinct; diffuse-porous; rays conspicuous to naked eye; used for boxes, furniture, railroad ties.

General: Native to Nebraska along the Missouri River as far north as Omaha, and to most of the eastern U.S. Has been planted in all sections of Nebraska. Usually found naturally along streams. Can get very large.

Very shade intolerant. The **London planetree** (*Platanus x acerifolia*), a cross between American sycamore and Oriental planetree (*P. orientalis*), is sometimes planted in Nebraska in place of sycamore. Its appearance is similar to that of sycamore, though its fruit heads usually occur 2 or 3 to a stem.



1. Winter twig, x $\frac{3}{4}$.
2. Portion of twig, side view, x $\frac{3}{4}$.
3. Vertical section of twig, summer bud, and leaf petiole, enlarged.
4. Leaf, x $\frac{1}{3}$.
5. Flowering shoots, x $\frac{1}{2}$.
6. Fruit, multiple of achenes, x $\frac{1}{3}$.
7. Achene, enlarged.

Illustrations from Barnes and Wagner:
Michigan Trees, page 289.

ROSACEAE—Rose family. Contains about 120 genera and 3,300 species. Widely distributed around the world, but more common in temperate climates. This family is relatively unimportant from a forestry standpoint, but is very important to agriculture and horticulture.

Black Cherry (*Prunus serotina*)

Leaves: Alternate; simple; oval to oblong-lanceolate; about 3" long and half as wide; dark green and glabrous above, paler beneath; **dense red-brown hairs along base of midrib on underside of leaf**; finely serrate margin with **incurved teeth**; petiole 1/4" to 1" long, conspicuous gland or bump on each side.

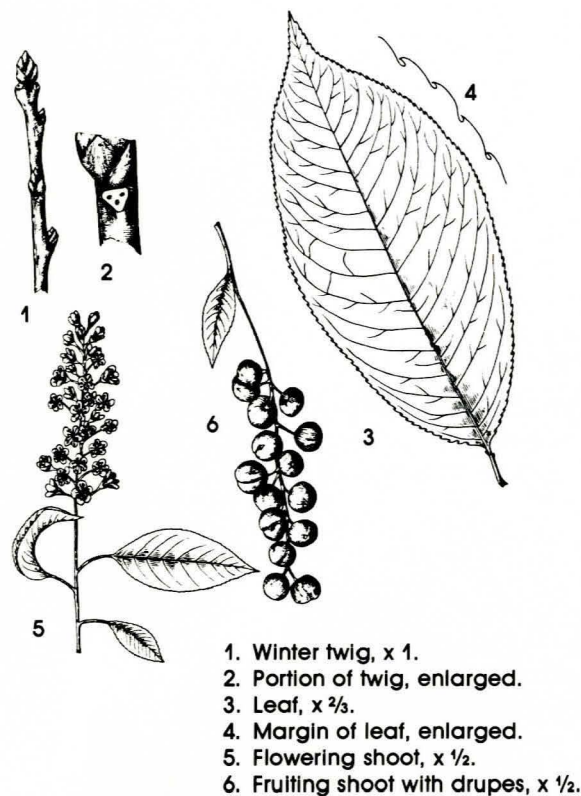
Twigs: Slender; usually bitter to taste; red to brown. Terminal bud 1/4" long, scaly, light brown; lateral buds same size as terminal.

Fruit: Drupe; dark red to nearly black; round; about 1/3" in diameter; edible; sweet; perfect flowers.

Bark: On young stems smooth, red-brown to nearly black, with obvious horizontal corky lines; on older stems peeling into small, platy scales with upturned edges.

Wood: Important; sapwood light brown; heartwood light to dark red-brown; growth rings fairly distinct; semi-ring-porous; rays plainly visible to the naked eye; highly valued furniture wood.

General: Native to southeastern Nebraska and most of the eastern U.S. May be more of a shrub when planted in western Nebraska. Attractive, white flowers appear in bunches in May. Grows naturally along fence rows, in open places, and on the edge of timbered areas. Intermediate shade tolerance.



Illustrations from Barnes and Wagner:
Michigan Trees, page 159.

Apple (*Malus pumila*)

Leaves: Alternate; simple; ovate; serrate margin; white hairy below.

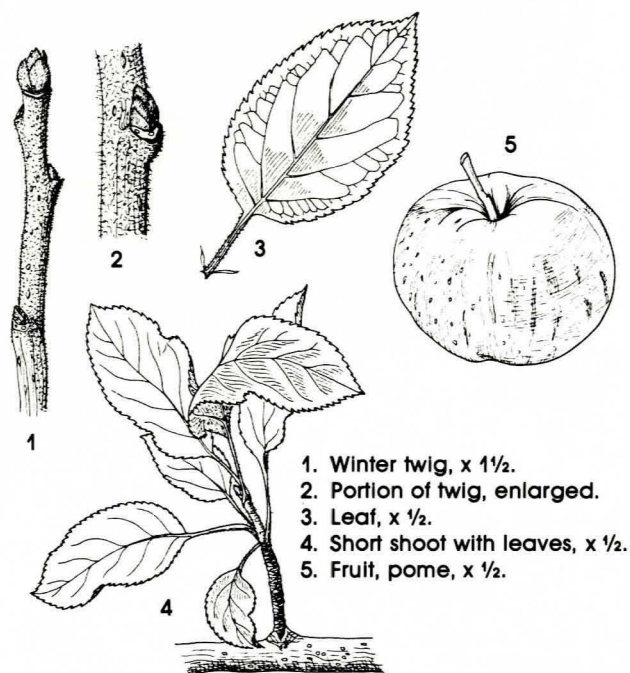
Twigs: Red-brown; somewhat woolly; characteristic sweet taste. Terminal bud **woolly (particularly at tip)**, blunt; lateral buds similar but smaller.

Fruit: Pome or apple; red, yellow, or green; perfect flowers.

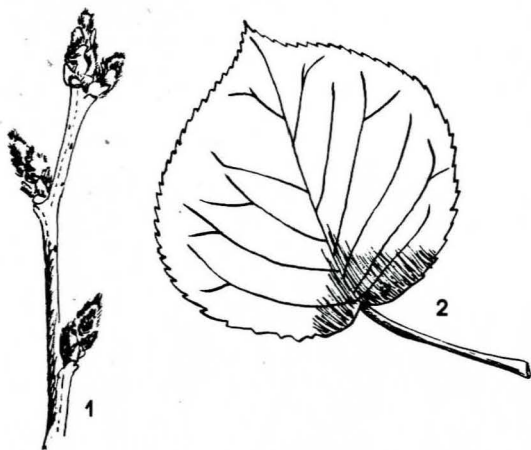
Bark: Thin; red-brown to gray-brown; divided by shallow furrows into wide, scaly ridges.

Wood: Not generally used for wood products other than fuel; hard; good firewood.

General: Not native to Nebraska. Cultivated apples are of European or Asiatic origin. Most eating apples are cultivars or varieties that must be grafted. Shade intolerant. Many native and cultivated crabapples exist (*Malus coronaria* and others) and some make excellent landscape trees. For a more complete treatment of crabapples, see Dirr (1990).



Illustrations from Barnes and Wagner:
Michigan Trees, page 141.



1. Winter twig, x 1.
2. Leaf, x 1/4.

Illustrations by Renee Lanik.

Bradford Pear (*Pyrus calleryana* "Bradford")

Leaves: Alternate; simple; broadly ovate to ovate; 1-1/2" to 3" long; rounded teeth on margin; glabrous; dark green; glossy.

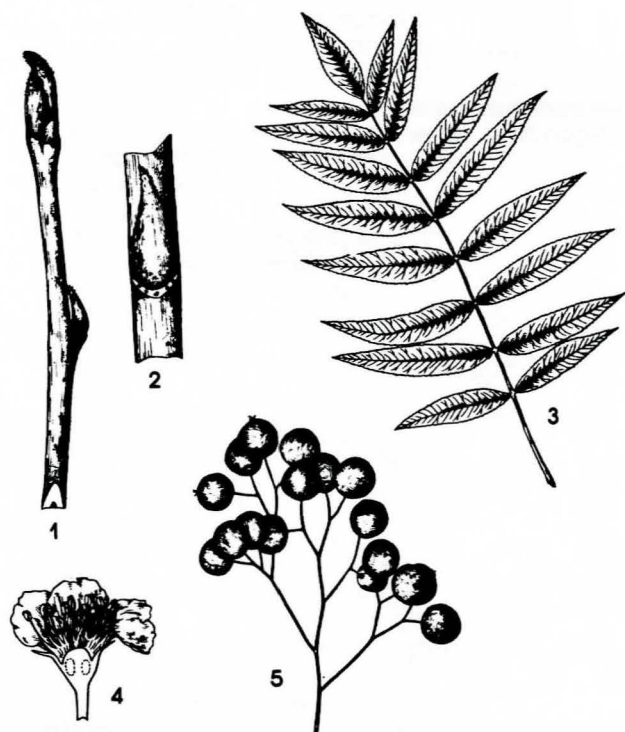
Twigs: Brownish-green; glabrous and glossy when mature. Terminal bud 1/4" to 1/2" long, **very wooly**, gray-brown; lateral buds similar in size and appearance.

Fruit: **Pome; rounded; 1/2" across or less; reddish-brown;** production is uneven and many trees may have no fruit; perfect flowers.

Bark: Gray-brown; smooth on younger stems breaking vertically into wide, flat plates.

Wood: No data available.

General: Native to China (not Nebraska). This small tree has been widely planted in Nebraska and the rest of the eastern half of the U.S. In Nebraska problems have started to appear, the worst being winter kill of buds and possibly cambium or cork-cambium. Though prized for its **beautiful white flowers** that bloom before the leaves mature and for its fall color, Nebraska may be too far north for this selection. Shade intolerant. Other selections of *Pyrus calleryana* (collectively called Callery pears) that are better-suited to Nebraska include "Aristocrat", "Chanticleer", and "Redspire".



1. Winter twig, x 1.
2. Portion of twig, enlarged.
3. Leaf, x 1/5.
4. Vertical section of flower, enlarged.
5. Portion of a fruit cluster, x 1.

Illustrations from Otis:
Michigan Trees, page 143.

American Mountain-ash (*Sorbus americana*)

Leaves: Alternate; once pinnately compound; 6" to 8" long; 7 to 17 leaflets; leaflets 1-1/2" to 4" long, 1/2" to 3/4" wide, oblong-oval to lanceolate, margin sharply serrate, dark green and glabrous above, paler beneath.

Twigs: Stout; at first red-brown and pubescent, later becoming dark brown and glabrous. Terminal bud 1/4" to 3/4" long, pointed, dark red, glabrous to slightly hairy, and sticky.

Fruit: **Berry-like pome;** round; 1/4" to 1/2" diameter; **bright orange-red;** bitter taste; perfect flowers.

Bark: Thin; light gray; smooth or slightly scaly.

Wood: Unimportant; sapwood light colored, thick; heartwood light brown; light; soft; weak; diffuse-porous.

General: Native to the northern half of the eastern U.S. as far west as Minnesota, the Appalachians, and eastern Canada (not Nebraska). A small, slow-growing, short-lived tree that prefers cool, moist sites. Shade intolerant. **European Mountain-ash (*S. aucuparia*)** is a similar tree that is native from Europe to western Asia and Siberia and is naturalized in some parts of the northern U.S. and Canada (not Nebraska). It has buds that are densely covered with long white hairs and leaflets that are shorter than those of American mountain-ash (up to 2-1/2" long). Its leaflets also are serrate but are entire for the lower third. Both species can be planted on cool, moist sites in Nebraska but European mountain-ash is more common.

Downy Serviceberry (*Amelanchier arborea*)

Leaves: Alternate; simple; oblong-ovate to oval; 2" to 4" long; finely serrate margin; pointed tip; dark green and glabrous above, pale below; petioles thin.

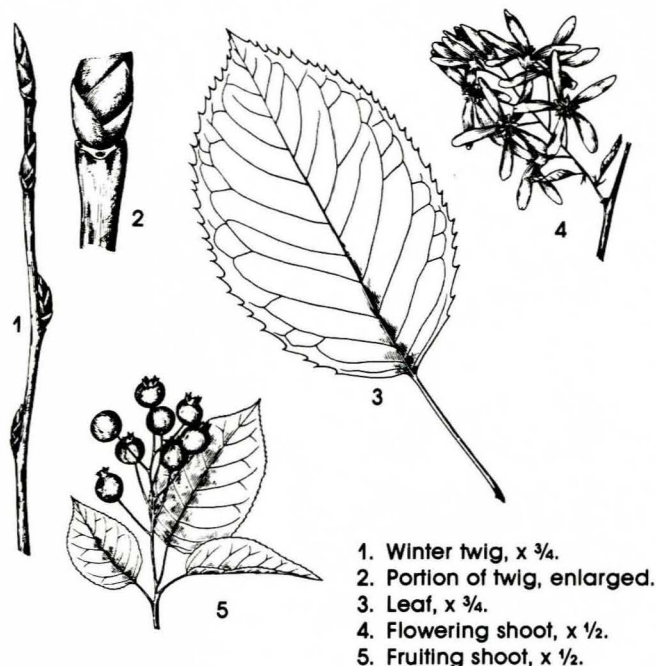
Twigs: Slender; red-brown to dark gray; bitter almond taste. Terminal bud 1/4" to 1/2" long, conical, pointed, chestnut-brown.

Fruit: **Berry-like pome**; round; 1/4" to 1/2" diameter; dark red to purple; more or less with a gray to white waxy coating; sweet; perfect flowers.

Bark: Thin; gray, often streaked with darker lines; smooth or slightly furrowed with scaly ridges.

Wood: Unimportant; sapwood light colored, thick; heartwood light brown; heavy; hard; close-grained; diffuse-porous.

General: Native to extreme southeastern Nebraska and most of the eastern U.S. Found in Nebraska on top of east-facing bluffs along the Missouri River. A small tree mixed with other hardwoods. **Beautiful flowers with white, showy petals appear in early spring** before other trees are active. Shade tolerant.



Illustrations from Barnes and Wagner:
Michigan Trees, page 147.

Downy Hawthorn (*Crataegus mollis*)

Leaves: Alternate; simple; broad ovate; 2" to 4" long and almost as wide; margin sharply **doubly serrate with several shallow lobes on each side**; very hairy underneath when young, later hairy mainly on veins; petiole 1" to 2" long.

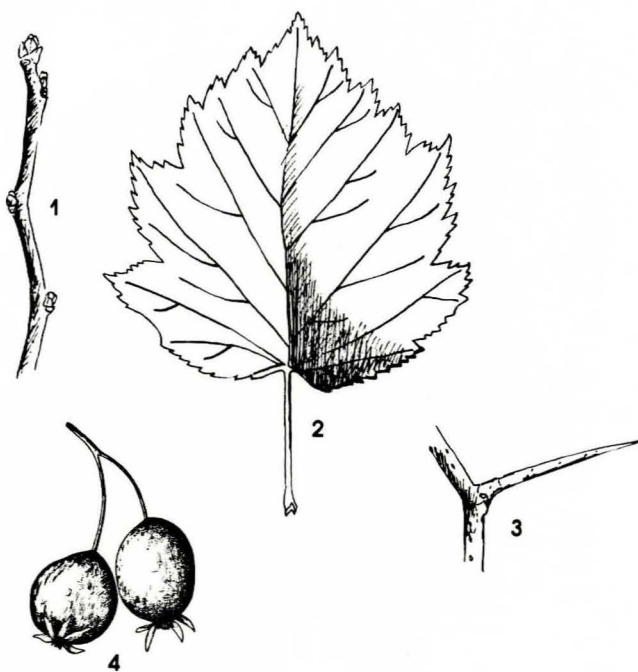
Twigs: More or less zig-zag; usually with **stiff, sharp, curved thorns**. Terminal bud small, round, scaly, and shiny brown; lateral buds similar.

Fruit: **Small pome**; round; 1/2" to 1" diameter; red; flesh dry and mealy; matures in fall and often persists into winter; perfect flowers.

Bark: Grayish-brown; scaly or slightly furrowed.

Wood: Unimportant; sapwood light colored, thick; heartwood red-brown; heavy; hard; close-grained; diffuse-porous; occasionally used for tool handles and canes.

General: Downy hawthorn is native to extreme eastern Nebraska and much of the eastern U.S. Small, slow growing tree. Has showy, white, 1" diameter flowers that appear in late spring. Shade intolerant. Other native Nebraska hawthorns are **fleshy hawthorn** (*C. succulenta*), and **fireberry hawthorn** (*C. chrysocarpa*). **Cockspur hawthorn** (*C. crusgalli*) (usually a thornless variety), **Washington hawthorn** (*C. phaenopyrum*), **English hawthorn** (*C. laevigata*), and others are planted in Nebraska. See Dirr (1990) for a more complete discussion of hawthorns.



1. Winter twig, x 3/4.
2. Leaf, x 3/4.
3. Thorn, x 1.
4. Fruit, pome, x 1.

Illustrations from Otis:
Michigan Trees, page 151.
Illustrations 1-3 by Renee Lanik.

FABACEAE—Legume family. Contains about 550 genera and 15,000 species. Widely distributed around the world. Second to the grass family in economic importance worldwide, though the woody species in this family are less important than some of the herbaceous species (beans, peas, alfalfa, clover, etc.). Most of the species in this family have root nodules with bacteria in them that can fix nitrogen. **Fruit is a legume.**

Honeylocust (*Gleditsia triacanthos*)

Leaves: Alternate; both once and twice pinnately compound; once pinnately compound leaves with 15 to 30 nearly stalk-less leaflets; twice pinnate leaves with 4 to 7 pairs of 6" to 8" long, lateral "branches"; leaflets ovate to ovate-lanceolate, up to 1-1/2" long by 3/4" wide, margins with fine, rounded teeth, leaflet tip pointed or rounded; yellow color in fall.

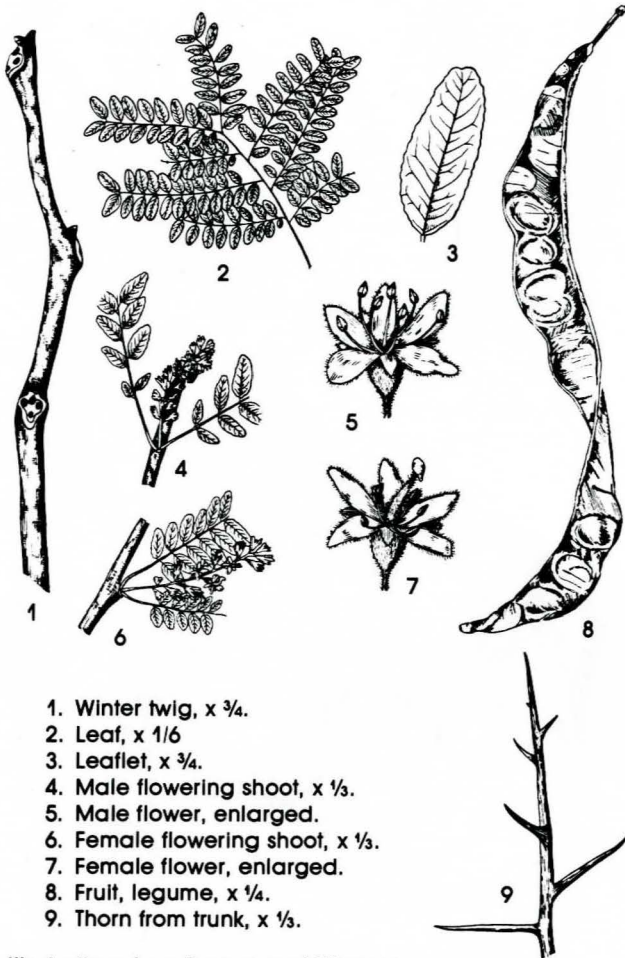
Twigs: Stout to slender; glabrous; glossy; zigzag; often having stiff, sometimes branched, **brown to red thorns from 3" to 12" long**; thornless varieties are more often planted. No terminal bud; lateral buds small, nearly hidden by bark, 3 or more at each leaf scar.

Fruit: A flat, strap-shaped legume; red-brown; twisted; 12" to 18" long; containing 12-14 dark brown, oval seeds; some varieties do not bear fruit; polygamo-dioecious.

Bark: Smooth and gray on younger branches; on older stems becoming gray to nearly black, and broken by vertical furrows into plates or scaly ridges.

Wood: Slightly important; sapwood yellow; heartwood red-brown; growth rings conspicuous; ring-porous; rays conspicuous to naked eye; used for veneer and firewood.

General: Native to eastern Nebraska and most of the eastern U.S. Very hardy and drought resistant. Often invades old fields. Thornless, fruitless varieties are often planted as shade trees. This species does not fix nitrogen. Shade intolerant.



1. Winter twig, x 3/4.
2. Leaf, x 1/6
3. Leaflet, x 3/4.
4. Male flowering shoot, x 1/3.
5. Male flower, enlarged.
6. Female flowering shoot, x 1/3.
7. Female flower, enlarged.
8. Fruit, legume, x 1/4.
9. Thorn from trunk, x 1/3.

Illustrations from Barnes and Wagner:
Michigan Trees, page 167.
Illustration 8 by Renee Lanik.

Kentucky Coffeetree (*Gymnocladus dioica*)

Leaves: Alternate; twice pinnately compound; very large, **can be 2' to 3' long**; 20 to 40 ovate leaflets, 1-1 1/2" long, pointed at tip, entire margins.

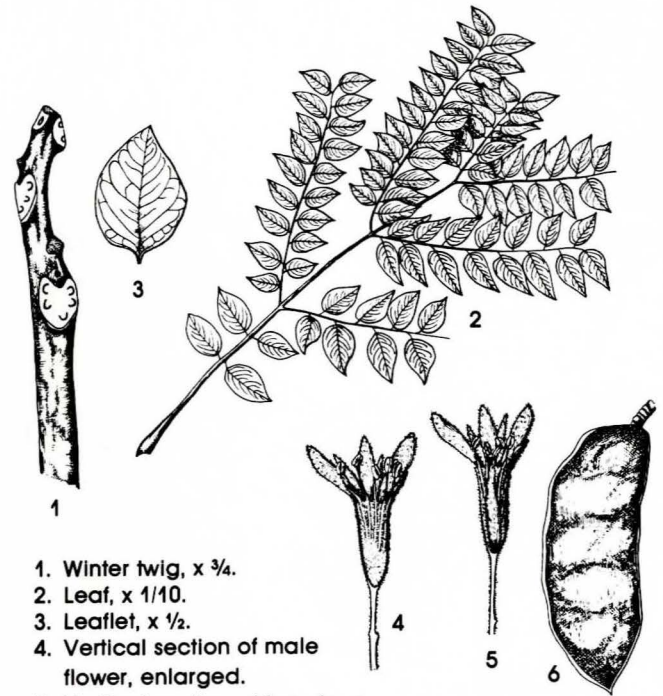
Twigs: Very stout; brown; glabrous or velvety; pith is wide and salmon-pink. No terminal bud; lateral buds deeply sunken in the bark; brown; hairy; 2 at each leaf scar.

Fruit: A flat legume; red-brown; leathery; pointed; 4" to 6" long by 1-3/4" wide; remaining closed until or through winter; contains 4 to 8 olive-brown, flat, very-hard seeds imbedded in a sweet pulp; dioecious or polygamo-dioecious.

Bark: Smooth and brown to gray on younger branches; on older stems turning gray, furrowed, with curved scales.

Wood: Unimportant; sapwood yellow; heartwood red; growth rings conspicuous; ring-porous; rays not conspicuous to naked eye.

General: Native to eastern Nebraska and most of the central-eastern U.S. Never very common naturally. Seeds ground and used as a coffee substitute by early settlers. Shade intolerant.



1. Winter twig, x 3/4.
2. Leaf, x 1/10.
3. Leaflet, x 1/2.
4. Vertical section of male flower, enlarged.
5. Vertical section of female flower, enlarged.
6. Fruit, legume, x 1/4.

Illustrations from Barnes and Wagner:
Michigan Trees, page 165.

Eastern Redbud * Judas-tree (*Cercis canadensis*)

Leaves: Alternate; simple; **heart-shaped**; 3" to 5" wide; entire margin; petiole long, slender.

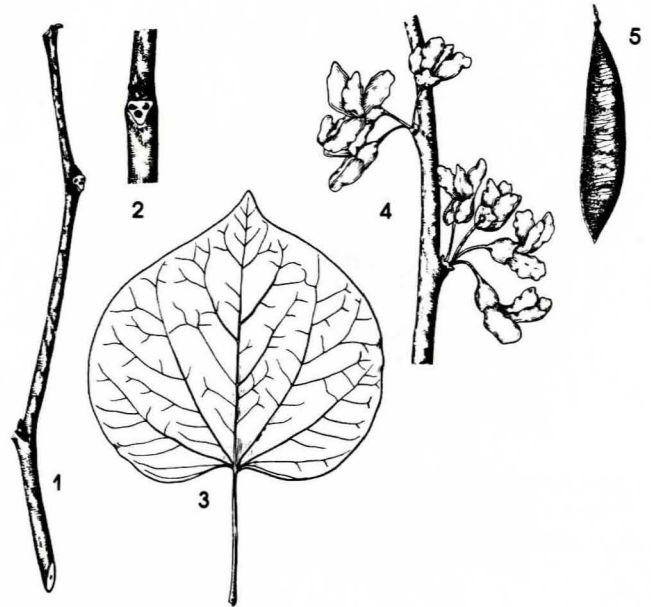
Twigs: Usually zigzag; bark on twigs glossy brown. No terminal bud; lateral buds small, blunt, scaly, chestnut-brown.

Fruit: Legume; short-stalked; flat; brown; 2" to 4" long; 1/2" wide; pointed on both ends; contains 8 to 12 brown, hard seeds; perfect flowers.

Bark: Thin; gray; becoming scaly on old trunks with cinnamon-red inner bark.

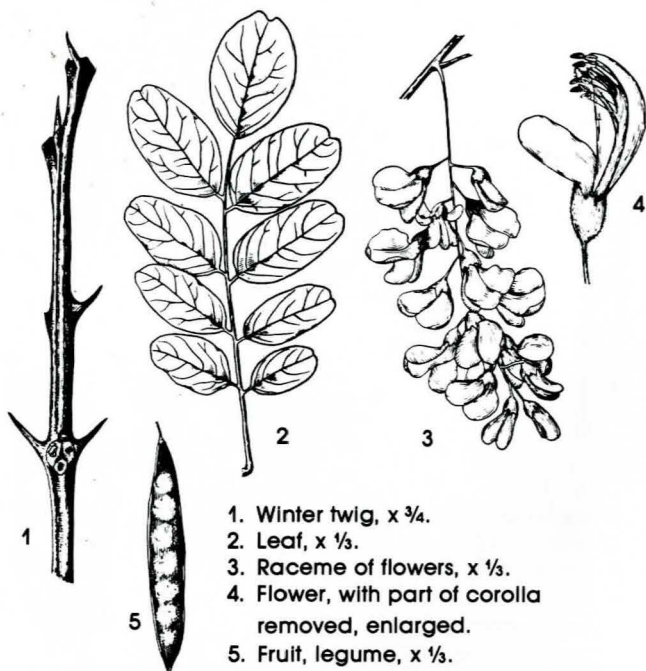
Wood: Little data published; hard; brown.

General: Native to southeast Nebraska and most of the eastern U.S. Never gets very large. **Beautiful purple-pink flowers** that appear before the leaves in April. Shade tolerant.



1. Winter twig, x 3/4.
2. Portion of twig, front view, enlarged.
3. Leaf, x 1/2.
4. Flowering twig, x 3/4.
5. Fruit, legume, x 1/3.

Illustrations from Barnes and Wagner:
Michigan Trees, page 169.



1. Winter twig, x $\frac{3}{4}$.
2. Leaf, x $\frac{1}{3}$.
3. Raceme of flowers, x $\frac{1}{3}$.
4. Flower, with part of corolla removed, enlarged.
5. Fruit, legume, x $\frac{1}{3}$.

Illustrations from Barnes and Wagner:
Michigan Trees, page 163.



1. Winter twig, x $\frac{3}{4}$.
2. Leaf, x $\frac{1}{3}$.

Illustrations by Renee Lanik.

Black Locust (*Robinia pseudoacacia*)

Leaves: Alternate; once pinnately compound; 8" to 14" long; 7 to 19 elliptical, ovate-oblong, or ovate leaflets, entire margins.

Twigs: Moderately stout; often zigzag; generally have **short, stiff spines, 1/4" to 1/2" long, in pairs at bases of leaves**. No terminal bud; lateral buds hidden under cracks of bark near leaf scar.

Fruit: A dark brown, flat legume; 3" to 5" long; containing 4-8 flat brown seeds; perfect flowers.

Bark: Red-brown to nearly black; deeply furrowed into criss-crossing scaly ridges; inner bark may be poisonous and should not be chewed.

Wood: Moderately important; sapwood yellow; heartwood yellow to golden-brown and rot-resistant; growth rings distinct; ring-porous; rays generally visible to the naked eye; used for fence posts, railroad ties, etc.

General: Native to the central-eastern U.S. (not Nebraska). Widely planted and naturalized east of the Rockies. Fast growing. **Has very attractive, fragrant, white flowers**. Shade intolerant.

Japanese Pagodatree (*Sophora japonica*)

Leaves: Alternate; once pinnately compound; 6" to 10" long; 7 to 17 ovate to ovate-lanceolate leaflets, 1" to 2" long, entire margins, rounded at base, bright green and lustrous above, somewhat waxy to hairy beneath.

Twigs: Slender; glabrous; **green on twigs up to 4 to 5 years old**; pith solid, greenish. No terminal bud; lateral buds blackish, hidden by leaf scar or by base of rachis when leaves are attached.

Fruit: A yellow-brown legume; 3" to 8" long; containing 3-6 brown seeds; perfect flowers.

Bark: Similar to black locust except gray-brown.

Wood: No data available.

General: Native to China and Korea (not Nebraska).

Creamy-white showy flowers that bloom in July or August. Good ornamental tree. Shade intolerant.

RUTACEAE—Rue family. Contains 140 genera and about 1,300 species. Generally found in warm and temperate regions. Includes the commercially important *Citrus* genus (orange, lemon, lime, etc.).

Amur Corktree (*Phellodendron amurense*)

Leaves: **Opposite**; once pinnately compound; 10" to 15" long; 5 to 11 ovate to ovate-lanceolate leaflets, 2-1/2" to 4-1/2" long, entire margins, rounded or narrowed at base, dark green and lustrous above, glabrous to slightly hairy along veins beneath.

Twigs: Stout; glabrous; orange-yellow to yellowish-gray eventually becoming brown; **inner bark bright yellow-green on young stems**. No terminal bud; **lateral buds silky, red or bronze, hidden by base of rachis when leaves are attached**.

Fruit: Drupe; round; 1/2" diameter; strong odor when crushed; ripens in October and may persist into winter; found only on female trees; perfect flowers.

Bark: Gray; smooth when young; becoming furrowed in an interlacing pattern on older portions of trunk; thick and corky.

Wood: No data available.

General: Native to northern China, Manchuria, and Japan (not Nebraska). Males often planted in landscape. Good ornamental tree. Shade intolerant.



1. Winter twig, x 1/2.
2. Leaf, x 1/4.

Illustrations by Renee Lanik.

SIMAROUBACEAE—Quassia family. Contains 32 genera and about 200 species. Chiefly tropical and subtropical.

Tree-of-Heaven * Ailanthus (*Ailanthus altissima*)

Leaves: Alternate; once pinnately compound; **1' to 4' long** with 11 to 41 leaflets; leaflets ovate-lanceolate, 3" to 6" long, entire margins except for 1-2 teeth near base; bad smelling when crushed.

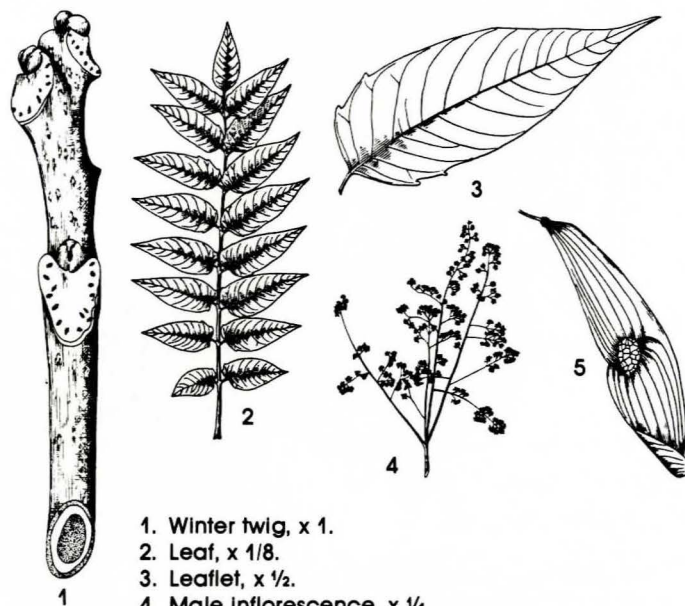
Twigs: Very coarse; velvety or downy; brown pith. No terminal bud; Lateral buds round, brown, normally hairy, relatively small.

Fruit: Oblong; spirally twisted wing in center of which is a single, dry seed; normally occurs in great abundance; dioecious.

Bark: **Thin; gray; smooth**; becomes slightly furrowed with age.

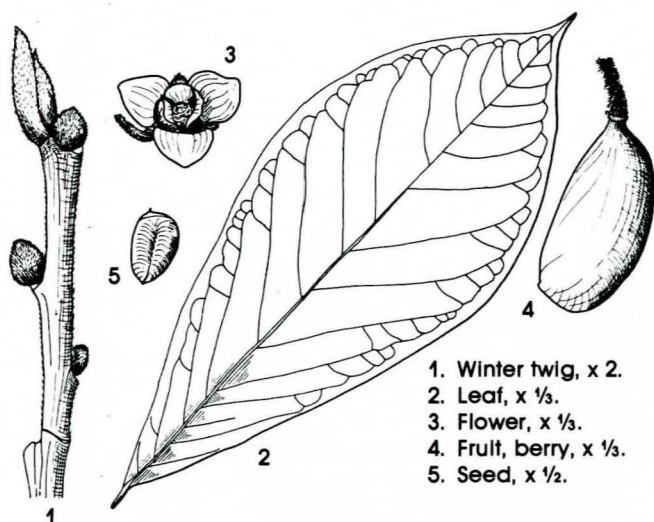
Wood: Unimportant; little information is published; light colored; brittle.

General: Native to China (not Nebraska) but becoming naturalized over much of the eastern U.S. Starts readily from seed that is scattered by wind, and from root sprouts. Thrives under almost any type of condition, especially harsh, urban conditions. Resistant to smoke and gases, difficult to get rid of. Shade intolerant.



1. Winter twig, x 1.
2. Leaf, x 1/8.
3. Leaflet, x 1/2.
4. Male inflorescence, x 1/4.
5. Fruit, samara, x 1.

Illustrations from Barnes and Wagner:
Michigan Trees, page 179.



Illustrations from Barnes and Wagner:
Michigan Trees, page 103.

ANNONACEAE—Custard-apple family. Contains more than 70 genera and 600 species. Widely distributed throughout the tropical regions of Asia, Africa, Australia, and the Americas.

Pawpaw (*Asimina triloba*)

Leaves: Alternate; simple; obovate-oblong; **10" to 12" long**, 4" to 6" wide; entire margin; pointed tip; base wedge-shaped; strong smelling when crushed.

Twigs: Slender; brown; hairy; divided pith. Terminal bud flat, about 1/2" long, with rust-colored hairs.

Fruit: **Banana-like berry; 3" to 5" long**; oblong; yellow at first, finally turning brown; flesh sweet and edible, especially while still yellow; perfect flowers.

Bark: Thin; brown to gray with blotches; smooth or warty.

Wood: Unimportant; little known.

General: Native to southeast Nebraska and most of the eastern U.S. Shrub to small tree. Unusual purple-colored flowers. Intermediate shade tolerance.

ACERACEAE—Maple family. Contains 2 genera and about 117 species. Widely scattered through the Northern Hemisphere, but most common in the Himalayan Mountains and in central China. **Opposite leaf arrangement.**

Boxelder (*Acer negundo*)

Leaves: Opposite; **once pinnately compound with 3 to 7 leaflets**; leaflets quite variable, ovate to lanceolate, coarsely serrate margins or sometimes 3-lobed at base; rachis stout, enlarged at the base.

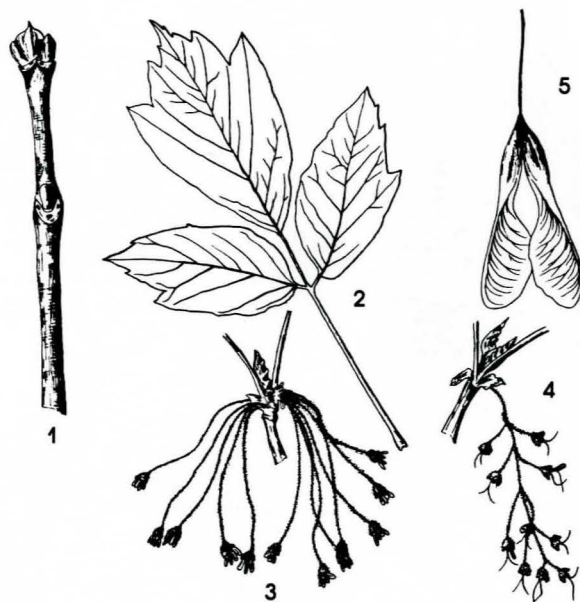
Twigs: Stout; **green to purple-green**; frequently covered with a blue-white coating. Terminal bud oval, somewhat white and woolly.

Fruit: Samara; V-shaped; double-winged; hangs down; ripens in fall; dioecious.

Bark: Thin; pale gray or light brown; deeply divided by furrows into rounded, interlacing ridges.

Wood: Unimportant; sapwood white; heartwood light brown; often colored by mineral stains; growth rings not very distinct; diffuse-porous; used for cheap furniture, etc.

General: Native to all of Nebraska, most of the U.S., and parts of Canada and Mexico. Very common, but undesirable as an ornamental. Very hardy. Most people do not realize that boxelder is a maple because of its common name and compound leaves. Intermediate shade tolerance.



1. Winter twig, x 3/4.
2. Leaf, x 1/3.
3. Male flowering shoot, x 1/2.
4. Female flowering shoot, x 1/2.
5. Fruit, samara, x 3/4.

Illustrations from Barnes and Wagner:
Michigan Trees, page 205.

Silver Maple (*Acer saccharinum*)

Leaves: Opposite; simple; about 4" to 7" wide and long; deeply, palmately 5-lobed; margins of end lobe V-shaped; coarsely serrate margins; green and glabrous on upper surface; **silver-white below**; turn pale yellow in fall; petiole 3" to 5" long.

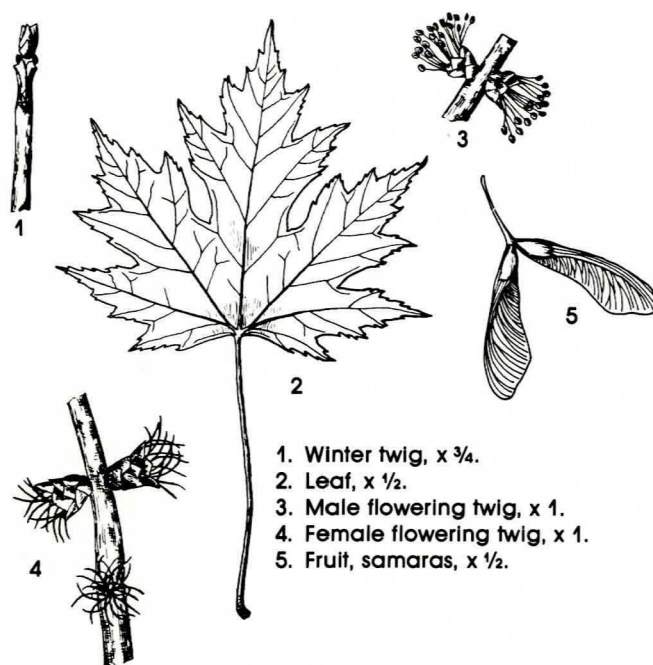
Twigs: Slender; orange-brown to red; disagreeable odor when bruised. Terminal bud blunt, 1/8" to 1/4" long.

Fruit: Samara; **2 widely spread wings, about 1-1/2" long**; mature in late spring and germinate immediately; polygamous.

Bark: Smooth and silver-gray on young stems; later breaking into long, thin, scaly plates that curl away from the tree at the ends.

Wood: Moderately important; sapwood white; heartwood light brown; growth rings not very distinct; diffuse-porous; used as a substitute for sugar maple in flooring, furniture, boxes, pallets, crates, and novelties.

General: Native to eastern Nebraska and most of the eastern U.S. A large and beautiful tree. Grows rapidly, but tends to be brittle and breaks easily in storms. Shade tolerant.



Illustrations from Barnes and Wagner:
Michigan Trees, page 197.

Norway Maple (*Acer platanoides*)

Leaves: Opposite; simple; 4" to 7" wide and long; typically palmately 5-lobed; lobes sharply pointed; somewhat serrate margin; **bright green to dark purple**, depending on variety; turning yellow in fall; petiole 2" to 4" long; **milky sap** is visible when petiole broken or removed from stem (this may disappear late in the summer).

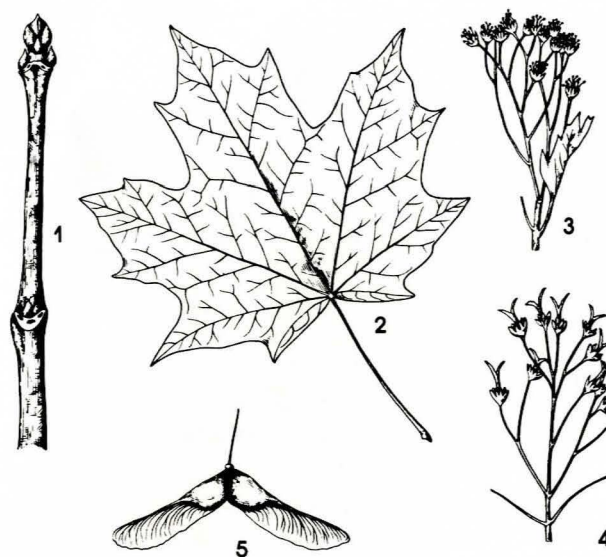
Twigs: Stout; olive-brown; glabrous; leaf scars meet. Terminal bud 1/4" to 3/8" long, rounded, green-red to red, glabrous; lateral buds smaller.

Fruit: Samara; 2 wide-spread wings, 1-1/2" to 2" long; matures in September-October; polygamous.

Bark: Smooth and gray-brown on young stems; furrowed on older stems.

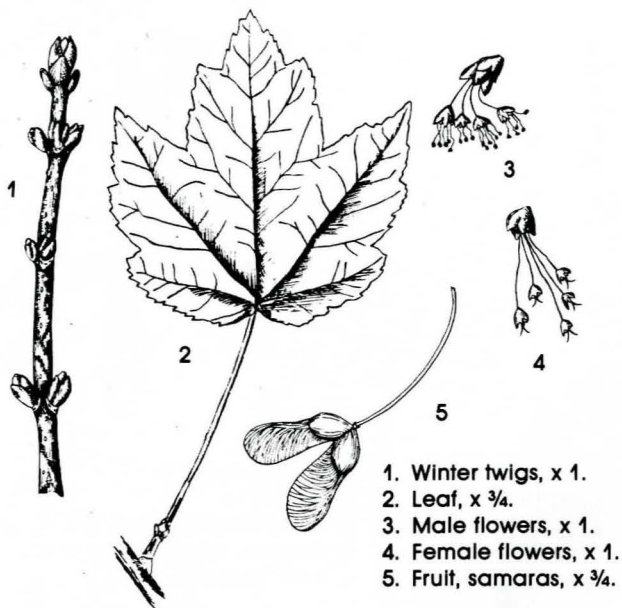
Wood: Little known in U.S.; Presumably similar to sugar maple.

General: Native to Europe from Norway south (not Nebraska). Often planted in Nebraska as an ornamental tree. Many varieties are available including "Crimson King" with dark purple leaves in summer. Often wrongly called red maple because of this leaf color. However, there are also green-leaved varieties. Shade tolerant.



1. Winter twig, x 3/4.
2. Leaf, x 1/3.
3. Raceme of staminate flowers, x 1/2.
4. Raceme of female flowers, x 1/2.
5. Fruit, samaras, x 1/2.

Illustrations from Barnes and Wagner:
Michigan Trees, page 203.



Illustrations from Barnes and Wagner:
Michigan Trees, page 195.
Illustration 2 by Renee Lanik.

Red Maple (*Acer rubrum*)

Leaves: Opposite; simple; 2" to 6" wide and long; **typically palmately 3-lobed** (rarely 5-lobed); coarsely serrate margin; turning scarlet in fall; petiole 2" to 4" long.

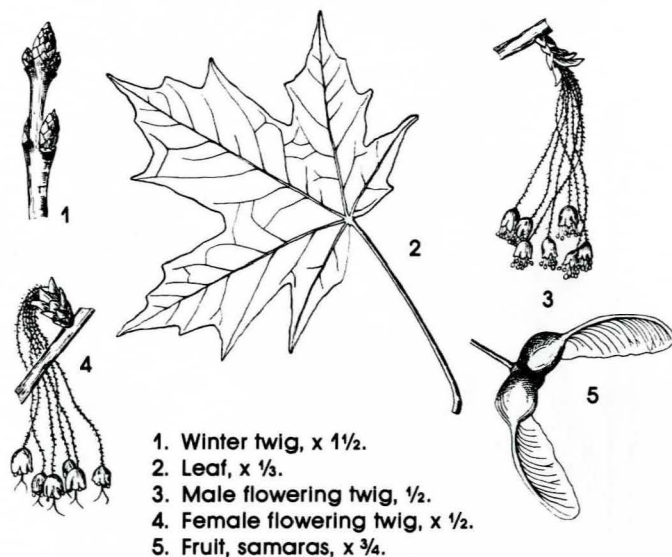
Twigs: Slender; dark red; without a disagreeable odor when crushed. Terminal bud 1/16" to 1/8" long, red to green, not pointed.

Fruit: Samara; **2 slightly spread wings, 1/2" to 1" long**; matures in late spring; polygamous.

Bark: Smooth and light gray on young stems; eventually breaking into long, scaly plates separated by shallow furrows.

Wood: Moderately important; sapwood white; heartwood light brown; growth rings not very distinct; diffuse-porous; uses similar to silver maple.

General: Native to most of the eastern U.S. (not Nebraska). Resembles silver maple in many ways, but the smaller, 3-lobed leaf and smaller fruit are distinctive. Occasionally planted in Nebraska. Shade tolerant.



Illustrations from Barnes and Wagner:
Michigan Trees, page 193.

Sugar Maple (*Acer saccharum*)

Leaves: Opposite; simple; 3" to 5" wide and long; palmately **5-lobed**; **lobe margins entire or sometimes wavy serrate**; turn bright red to orange to yellow in the fall; petiole about 2" long.

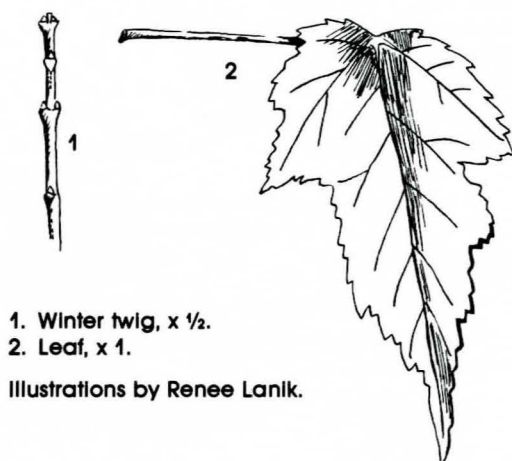
Twigs: Slender; glabrous; red-brown; shiny. Terminal bud 1/4" to 3/8" long, pointed, 4-8 pairs of scales.

Fruit: Samara; **U-shaped, double-winged**; matures in fall; polygamous.

Bark: Gray; deeply furrowed on older trees; with long, irregular plates or ridges; sometimes scaly.

Wood: Important; sapwood white with a red tinge; heartwood light brown; growth rings fairly distinct; diffuse-porous; uses as in silver maple but sugar maple is generally higher quality.

General: Native to most of the northeastern U.S. (east from Iowa and north from Tennessee)(not Nebraska). Commercially the most important of the maples. Noted for maple syrup made from its sap. Shade tolerant.



1. Winter twig, x 1/2.
2. Leaf, x 1.

Illustrations by Renee Lanik.

Amur Maple * Ginnala Maple (*Acer ginnala*)

Leaves: Opposite; simple; 1-1/2" to 3" long; **palmately 3-lobed, middle lobe longer than side lobes**; doubly serrate margin; dark green and lustrous above; light green beneath; turning yellow to red in fall; petiole 1/2" to 1-3/4" long.

Twigs: Slender; gray-brown; glabrous. Terminal and lateral buds 1/8" long, red-brown, glabrous.

Fruit: Samara; 2 parallel wings, 3/4" to 1" long; matures in fall; polygamous.

Bark: Smooth and gray-brown with dark streaks like serviceberry.

Wood: No data available.

General: Native to central and northern China, Manchuria, and Japan (not Nebraska). Many varieties are available commercially that vary from **small shrubs to small trees**. Moderately shade tolerant.

HIPPOCASTANACEAE—Buckeye family. Contains 3 genera and about 30 species. Widely scattered through the forests of North America, Europe, and Asia. Little importance for products. **Opposite leaf arrangement.**

Ohio Buckeye (*Aesculus glabra*)

Leaves: Opposite; palmately compound; **5 leaflets**, ovate or oval, 3" to 6" long, finely serrate margins, glabrous; bad smelling when crushed.

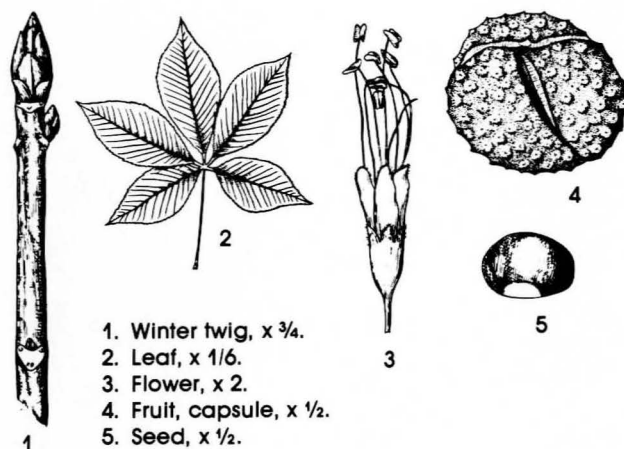
Twigs: Stout; glabrous; orange to brown to ash-gray. Terminal buds large; brown; not resinous.

Fruit: Round pod; thick; leathery; prickly; brown; 1" to 2" in diameter; containing **a large, smooth, shiny, brown kernel**, about 1" long; kernel is poisonous; perfect flowers.

Bark: Ash-gray; thick; deeply furrowed and scaled.

Wood: Unimportant; sapwood white to dull white; heartwood creamy to yellow; growth rings normally not visible; diffuse-porous.

General: Native to extreme southeastern Nebraska and the east-central U.S. Not common anywhere. Prefers moist, protected sites. Shade tolerant.



Illustrations from Barnes and Wagner:
Michigan Trees, page 183.

Horsechestnut (*Aesculus hippocastanum*)

Leaves: Opposite; palmately compound; **usually 7 leaflets**, obovate, 5" to 7" long, margins doubly serrate.

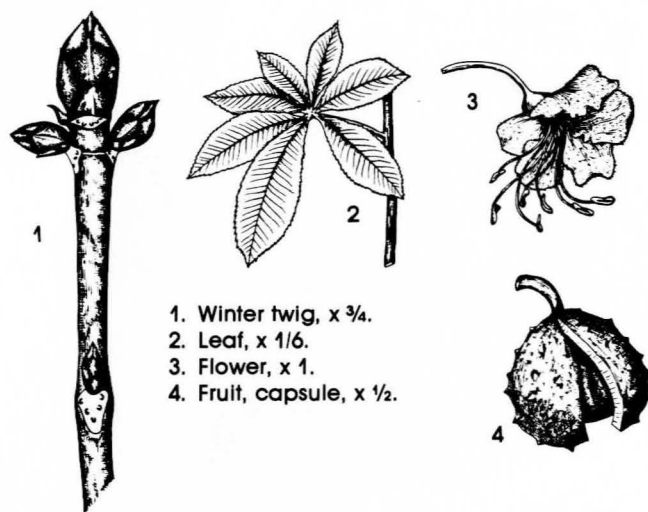
Twigs: Stout; glabrous; red-brown. Terminal buds over 1" long, brown, covered with waxy gum, shiny.

Fruit: Round pod; thick; leathery; prickly; yellow-brown; 1" to 2" in diameter; containing **1 to 3 smooth, shiny, brown kernels**; perfect flowers.

Bark: Similar to Ohio buckeye.

Wood: Similar to Ohio buckeye.

General: Native to Asia (not Nebraska). Widely planted as an ornamental. Prefers moist, protected sites. Shade tolerant.



Illustrations from Barnes and Wagner:
Michigan Trees, page 185.

SAPINDACEAE—Soapberry family. Contains 120 genera and more than 1200 species. Most abundant in tropical regions, with only a few species in the temperate zone. **Leaves usually pinnately compound.**

Goldenraintree (*Koelreuteria paniculata*)

Leaves: Alternate; once pinnately compound (some leaflets may be deeply lobed enough to appear twice pinnately compound; 6" to 18" long; 7 to 15 ovate to ovate-oblong leaflets, 1" to 4" long; **margins with coarse, irregular, rounded teeth; leaflets often lobed near base with lobes reaching nearly to midrib**; glabrous above, glabrous to slightly hairy along veins beneath.

Twigs: Stout; glabrous; greenish to light brown. No terminal bud; lateral buds brown with 2 scales, 1/8" to 3/16" long.

Fruit: Capsule; papery; 3-valved; 1-1/2" to 2" long; green at first, changing to yellow and then brown; with 3 black, hard, pea-like seeds inside; ripens in August to October; perfect flowers.

Bark: Light gray to brown; smooth when young; becoming furrowed and ridged on older portions of trunk.

Wood: No data available.

General: Native to China, Japan, and Korea (not Nebraska). Very good ornamental tree. **Beautiful golden-yellow 1/2" flowers held in 12" to 15" long heads that bloom in late June to early July;** very showy. Fairly slow growing. Shade intolerant.



1. Winter twig, x 1/2.

2. Leaf, x 1/4.

Illustrations by Renee Lanik.

TILIACEAE—Linden family. Contains 41 genera and about 400 species. Most abundant in the Southern Hemisphere, but widely scattered throughout the world.

American Basswood * American Linden (*Tilia americana*)

Leaves: Alternate; simple; **heart-shaped; 5" to 6" long and almost as wide;** coarsely serrate margin; pointed tip; glabrous; dark green above; paler below; petiole thin, 1" to 2" long.

Twigs: Usually zigzag; glabrous; green to red-gray. No terminal bud; lateral buds dark red or green, about 1/4" long, rounded, lopsided, usually with two visible scales.

Fruit: Nut-like drupe; round; 1/3" to 1/2" in diameter; clustered; **attached to leafy bract;** perfect flowers.

Bark: Smooth and gray-green on young stems; later turning gray-brown, furrowed, with narrow, scaly ridges.

Wood: Important; sapwood white to pale brown; heartwood pale brown; light; soft; growth rings fairly distinct; diffuse-porous; rays not visible without a hand lens; used for novelties, excelsior, containers, etc.

General: Native to eastern Nebraska and most of the northern and eastern U.S. Does best in rich, moist woodlands and along river bottoms. Several varieties and other species are commonly planted as ornamentals in Nebraska. Shade tolerant. **Littleleaf European linden** (*T. cordata*) is a European native with smaller leaves (up to 3" long) than American basswood. It is a good quality landscape tree that is quite popular in the Midwest.

ELAEAGNACEAE—Oleaster family. Contains 3 genera and about 30 species. Found in North America, Europe, and Asia. Most have their **surfaces covered with silver or brown scales.**

Russian-olive (*Elaeagnus angustifolia*)

Leaves: Alternate; simple; oblong; 1-1/2" to 3" long; entire margin; **silvery; scaly;** petiole short.

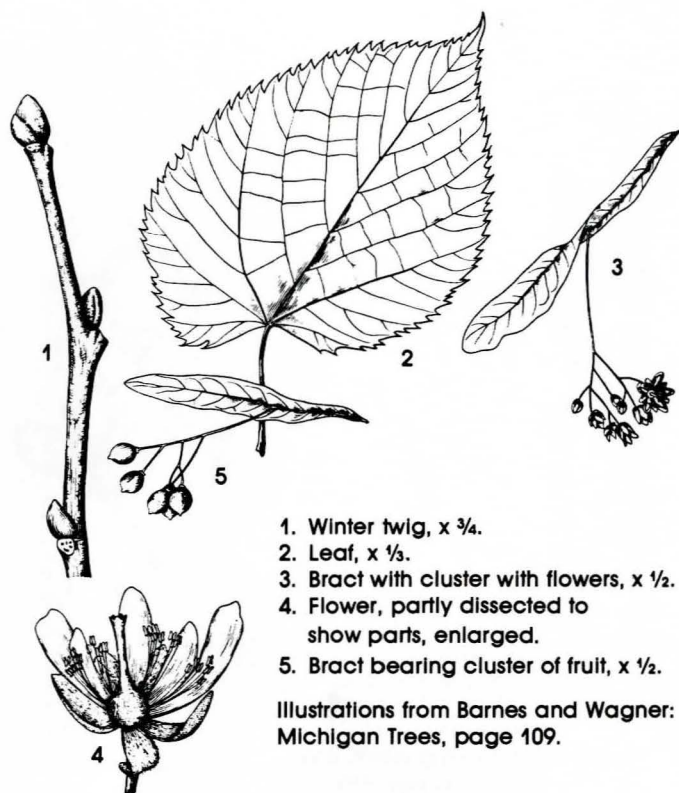
Twigs: Silvery; sometimes with spines. Buds small, round, gray-brown, with 4 exposed, silvery scales.

Fruit: **Drupe; silver-yellow;** 1/4" to 1/2" in diameter; perfect flowers.

Bark: Gray-brown; shallow furrows with narrow plates between.

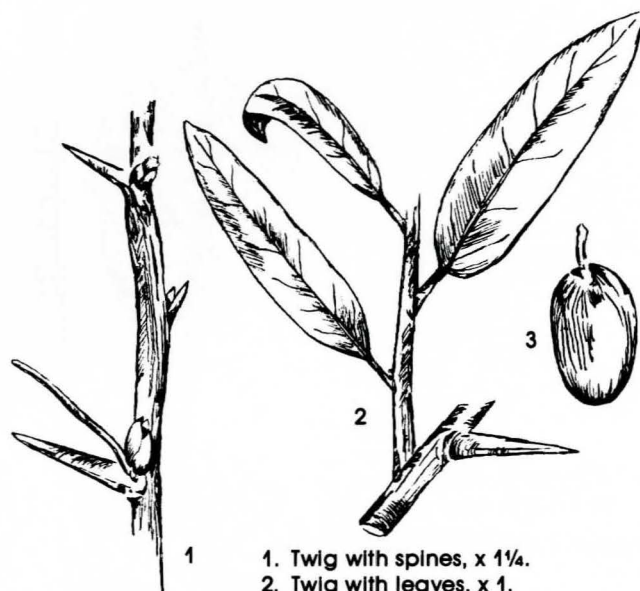
Wood: Unimportant; little data available; yellow to brown.

General: Native to Asia and southern Europe (not Nebraska). Has been planted extensively on the Great Plains and is becoming naturalized. Strongly affected by a stem canker. Shade intolerant.



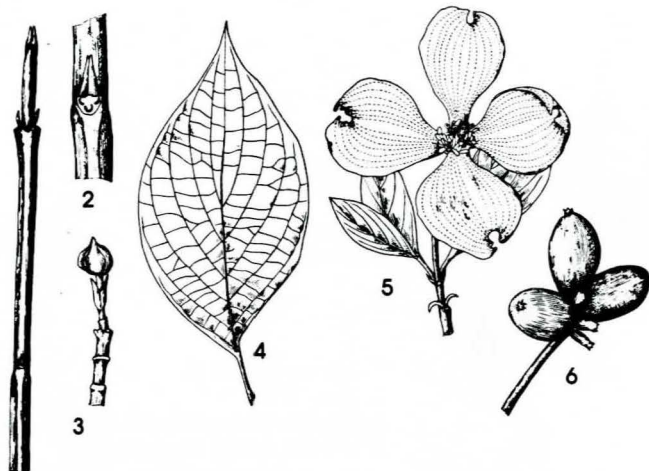
1. Winter twig, x 3/4.
2. Leaf, x 1/3.
3. Bract with cluster with flowers, x 1/2.
4. Flower, partly dissected to show parts, enlarged.
5. Bract bearing cluster of fruit, x 1/2.

Illustrations from Barnes and Wagner: Michigan Trees, page 109.



1. Twig with spines, x 1 1/4.
2. Twig with leaves, x 1.
3. Fruit, drupe, x 1 1/2.

Illustrations by Renee Lanik



1. Winter twig, with leaf buds, x 1.
2. Portion of twig, enlarged.
3. Winter twig, with flower bud, x 1.
4. Leaf, x 1/2.
5. Flowering shoot, x 1/2.
6. Fruit, drupes, x 3/4.

Illustrations from Barnes and Wagner:
Michigan Trees, page 175.

CORNACEAE—Dogwood family. Contains about 10 genera and 100 species. Scattered around the world, but more common in cooler areas of the Northern Hemisphere. Generally unimportant for wood products, but some have great ornamental value. **Opposite leaf arrangement.**

Flowering Dogwood (*Cornus florida*)

Leaves: Opposite; simple; oval; 3" to 6" long; **leaf veins parallel margin in an arc**; entire margin; surfaces hairy; bright green above; paler below; turning scarlet in fall; petiole short.

Twigs: Slender; purple; more or less covered with a white, waxy coating. Terminal bud 1/8" long, 2 scales meet in a straight line without overlapping; flower buds look like small lanterns or urns on branch tips.

Fruit: Drupe; bright red; about 1/3" long; in compact clusters; perfect flowers.

Bark: Thin; dark red-brown; broken into small, square blocks; very distinctive.

Wood: Unimportant; sapwood light pink-brown; heartwood dark brown; hard; heavy; growth rings distinct but not sharply delineated; diffuse-porous; rays visible to naked eye.

General: Native to most of the eastern U.S. (not Nebraska). Widely planted as an ornamental because of its **beautiful white or pink flowers**. A small tree that occurs naturally in the shady understory of other trees. Very shade tolerant.

EBENACEAE—Ebony family. Contains 5 or 6 genera and about 325 species. Generally found in the tropical and warmer forested areas in both hemispheres. Ebony wood comes from *Diospyros ebenum*.

Common Persimmon (*Diospyros virginiana*)

Leaves: Alternate; simple; oblong-ovate to oval; 3" to 6" long; entire margin; dark green and glabrous above; paler below and glabrous or slightly hairy along midrib; petiole 1/3" to 1" long.

Twigs: Slender; gray-brown. No terminal bud; lateral buds 1/8" long with 2 overlapping scales.

Fruit: Berry; orange to purple; round; about 1" to 1-1/2" long; with 4 semi-woody calyx lobes at base; ripens in fall; edible, though should not be picked until after a frost; polygamo-dioecious.

Bark: Thick; dark gray to black; **broken into square blocks; very distinctive.**

Wood: Moderately important; heartwood dark brown; strong; hard; heavy; ring-porous; used for golf club heads and other specialized purposes.

General: Native to the southern two-thirds of the eastern U.S. (probably not Nebraska). Does quite well in southeastern Nebraska. Shade intolerant.



1. Winter twig, x 1/2.
2. Fruit, berry, x 3/4

Illustrations by Renee Lanik.

OLEACEAE—Olive family. Contains about 30 genera and more than 400 species. Distributed through the temperate and tropical forests of the Northern Hemisphere. Olives and olive oil are produced by one species in this family (*Olea europaea*). Several popular ornamental shrubs and trees are also part of this family, including ash (*Fraxinus*), lilac (*Syringa*), Forsythia (*Forsythia*), and privet (*Ligustrum*).

Green Ash (*Fraxinus pennsylvanica*)

Leaves: Opposite; once pinnately compound; 10" to 12" long; 7-9 leaflets; leaflets oblong-lanceolate to elliptic, 4" to 6" long, glabrous on both surfaces, finely serrate margin; **turn bright yellow in fall.**

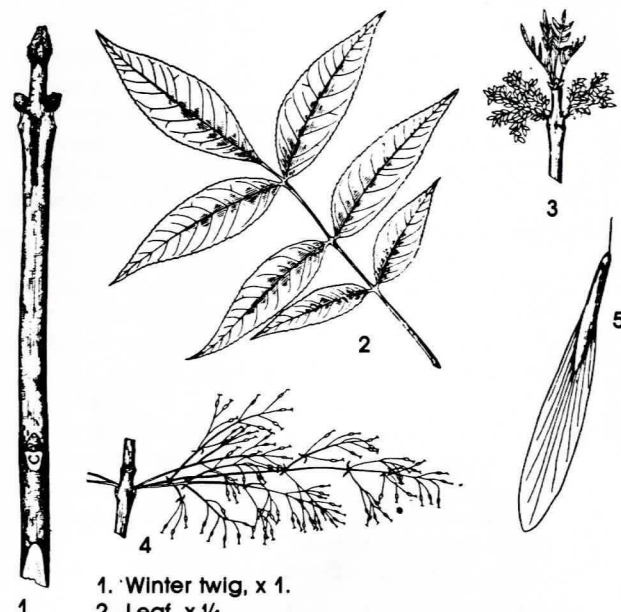
Twigs: Fairly stout; gray to brown; **leaf scar half-circular, straight or shallowly notched across the upper edge.** Terminal bud rusty brown, conical, hairy; lateral buds smaller.

Fruit: Samara; 1" to 2-1/2" long, 1/4" wide; paddle-shaped in dense clusters; often clinging to twigs into or throughout the winter; abruptly narrowed wing along the slender seed cavity; dioecious.

Bark: Ash-gray; sometimes with an orange tinge on younger trees; on older trees furrowed into diamond-shaped areas separated by narrow interlacing ridges; distinctive.

Wood: Important; sapwood white; heartwood light brown; growth rings distinct; ring-porous; rays not distinct; used for handles, tools, containers, furniture, lumber, etc.

General: Native to most of Nebraska and from about the Rockies east, including southern Canada. A tough, durable tree. Drought resistant. Good for windbreaks and as a shade tree. Intermediate shade tolerance.



1. Winter twig, x 1.
2. Leaf, x 1/4.
3. Staminate flowering branchlet, x 1/2.
4. Pistillate flowering branchlet, x 1/2.
5. Fruit, samara, x 1.

Illustrations from Poole:
Nebraska Trees, page 162.

White Ash (*Fraxinus americana*)

Leaves: Opposite; once pinnately compound; 8" to 12" long; 5 to 9 (mostly 7) leaflets; leaflets ovate to oblong-lanceolate, 3" to 5" long, glabrous on both sides, margins entire or barely serrate; rachis slightly grooved, glabrous; **turn purple in fall.**

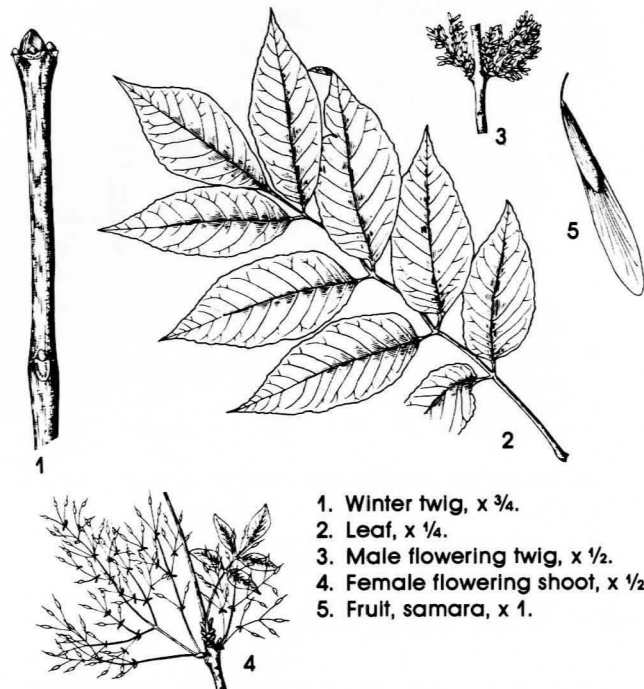
Twigs: Fairly stout; dark green to gray-green, occasionally purplish; glabrous; **leaf scar U-shaped with deep to shallow notch across top edge.** Terminal bud rusty brown, blunt, covered with 4-6 brown scales, glabrous (generally not hairy); lateral buds smaller, almost triangular.

Fruit: Samara; 1" to 2" long; 1/4" wide; paddle-shaped in dense clusters; often clinging to twigs into or throughout the winter; dioecious.

Bark: Similar to green ash but more deeply furrowed.

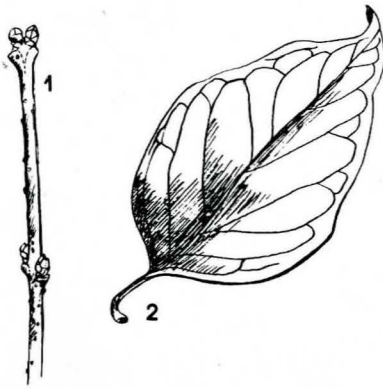
Wood: Important; like white ash in characteristics and uses.

General: Native to extreme southeastern Nebraska and most of the eastern U.S. Sometimes called "Autumn Purple" ash. A very desirable tree. Intermediate shade tolerance.



1. Winter twig, x 3/4.
2. Leaf, x 1/4.
3. Male flowering twig, x 1/2.
4. Female flowering shoot, x 1/2.
5. Fruit, samara, x 1.

Illustrations from Barnes and Wagner:
Michigan Trees, page 301.



1. Winter twig, x 1/2.
2. Leaf, x 1/2.

Illustrations by Renee Lanik.

Japanese Tree Lilac (*Syringa reticulata*)

Leaves: Opposite; simple; broad ovate to ovate; 2" to 5-1/2" long; entire margin; dark green above; gray-green beneath and glabrous to slightly hairy; petiole 1/2" to 1" long.

Twigs: Stout; glossy; glabrous; brown. Often with no terminal bud; lateral buds round with 4 sets of scales, brown.

Fruit: Capsule; curved; 3/4" long; warty; brown; perfect flowers.

Bark: On young and older branches reddish brown to brown with horizontal ridges called lenticels; gray and scaly on older trunks.

Wood: No data available.

General: Native Japan (not Nebraska). Has **beautiful white flowers held in 6" to 12" long heads that bloom in June**. Small to medium-sized tree. Shade intolerant.

BIGNONIACEAE—Trumpet Creeper family. Contains about 100 genera and 750 species. Most of the family is tropical, including some very fine furniture woods.

Northern Catalpa (*Catalpa speciosa*)

Leaves: Opposite or whorled in 3's; simple; heart-shaped; 4" to 10" long, 3" to 8" wide; entire margin.

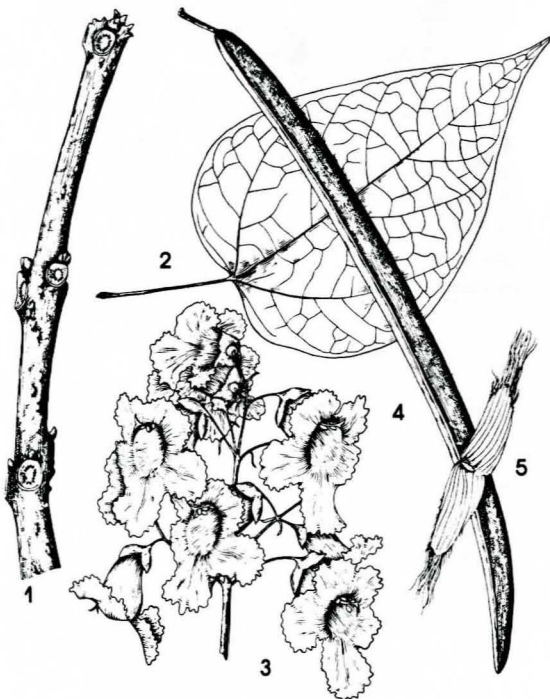
Twigs: Stout; green to purple; circular leaf scars. No terminal bud; buds smaller than leaf scars.

Fruit: Capsule; long; slender; 8" to 20" long; 1/2" in diameter; hangs on through the winter; perfect flowers.

Bark: Brown; broken into thick scales.

Wood: Not important; sapwood pale gray; heartwood gray-brown; growth rings distinct; ring-porous; durable; soft; used for fence posts and railroad ties.

General: Native to a small area in southeastern Missouri, southern Illinois and Indiana, western Tennessee and Kentucky, and northeastern Arkansas (not Nebraska). Has escaped cultivation and is naturalized in Nebraska. Has beautiful white flowers. Shade intolerant.



1. Winter twig, x 3/4.
2. Leaf, x 1/4.
3. Panicle of flowers, x 3/8.
4. Fruit, capsule, x 1/2.
5. Seed, x 1.

Illustrations from Barnes and Wagner:
Michigan Trees, page 295.



lossary

Achene: small, dry and hard one-seeded fruit.

Acorn: nut-like fruit of an oak with a scaly or warty cap.

Alternate leaves: leaves arranged on alternating sides of the twig.

Angiosperm: class of plants that has the seeds enclosed in an ovary; includes flowering plants.

Annual rings: a layer of wood—including spring-wood and summer-wood—grown in a single season; best seen in the cross-section of the trunk.

Awl-like leaves: short leaves that taper evenly to a point; found on junipers and redcedars.

Berry: fleshy fruit with several seeds.

Bisexual flower: a perfect flower; a flower with organs of both sexes present.

Broadleaf: trees having broad, flat-bladed leaves rather than needles; also a common name for hard woods.

Cambium: layer of tissue one to several cells thick found between the bark and the wood; divides to form new wood and bark.

Capsule: dry fruit that splits open, usually along several lines, to reveal many seeds inside.

Chambered pith: pith divided into many empty horizontal chambers by cross partitions.

Common name: familiar name for a tree; can be very misleading because common names vary according to local custom, and there may be many common names for one species.

Compound leaves: leaves with more than one leaflet attached to a stalk called a rachis.

Conifer: trees and shrubs that usually bear their seeds in cones and are mostly evergreen; includes pines, firs, spruces, yews and Douglas Fir.

Cross-section: surface or section of tree shown when wood is cross-cut; shows the circular growth rings.

Deciduous leaves: leaves that die and fall off trees after one growing season.

Dichotomous key: a key to tree identification based on a series of decisions, each involving a choice between two alternate identification characteristics.

Diffuse-porous: a type of hardwood in which vessels in the spring-wood are the same size as vessels in summer-wood (maples, birches, poplars, etc.).

Dioecious: having unisexual flowers with staminate (male) and pistillate (female) flowers borne on different trees.

Drupe: fleshy fruit with a single stone or pit.

Elliptic: resembling an ellipse and about one-half as wide as long.

Entire margin: leaf margins that are smooth (not toothed).

Evergreen: trees and shrubs that retain their live, green leaves during the winter and for two or more growing seasons.

Family: group of closely related species and genera; scientific name ends in "aceae".

Forest ecology: study of the occurrence of forest plants and animals in respect to their environment.

Genus: a group of species that are similar; the plural of genus is genera.

Glabrous: Smooth, with no hair or scales.

Gymnosperm: large class of plants having seeds without an ovary, usually on scales of a cone; includes conifers and the ginkgo.

Hardwoods: usually refers to trees that have broad-leaves and wood made up of vessels; similar to angiosperms.

Heartwood: nonliving wood (often dark) found in the middle of a tree's stem.

Imperfect flower: a unisexual flower with either functional stamens or pistils, but not both.

Inflorescence: the flowering portion of a plant.

Lanceolate: lance-shaped; about 4 times as long as wide and widest below the middle.

Lateral buds: buds found along the length of the twig (not at the tip); they occur where the previous year's leaves were attached.

Leaflets: small blades of a compound leaf attached to a stalk (rachis); without buds where they attach.

Legume: fruit that is a dry, elongated pod that splits in two, with seeds attached along one edge inside.

Lobed margin: leaf margin with gaps that extend more or less to the center of the leaf.

Lustrous: glossy, shiny.

Monocious: having unisexual flowers with staminate (male) and pistillate (female) flowers borne on the same tree, though often on different branches.

Multiple fruit: fruit made up of a cluster of ripened ovaries that came from many separate flowers attached to a common receptacle.

Naturalized: nonnative trees that have escaped cultivation and are growing in the wild.

Needle-like leaves: very thin, sharp, pointed, pin-like leaves; found on pines, firs and some other softwoods.

Node: the point on a stem at which leaves and buds are attached.

Nut: hard, dry fruit with an outer husk that some times does not split open readily and an inner shell that is papery to woody.

Obovate: inversely ovate.

Opposite leaves: leaves arranged directly across from each other on the twig.

Orbicular: circular in outline.

Oval: broadly elliptic, with the width greater than one-half the length.

Ovate: having the lengthwise outline of an egg, widest below the middle.

Palmately compound: compound leaves in which several leaflets radiate from the end of a stalk (rachis); like the fingers around the palm of a hand.

Perfect flower: a bisexual flower with functional stamens and pistils.

Persistent leaves: leaves that remain on the tree during winter.

Petiole: a slender stalk that supports a simple leaf.

Phloem: inner bark of a tree that carries food and sugars from the leaves to other parts of the tree.

Photosynthesis: process through which the leaves, with energy from sunlight, make food from water and carbon dioxide.

Pinnately compound: compound leaves in which leaflets are attached laterally along the rachis or stalk; leaves may be once, twice, or three-times pinnately compound.

Pistil: the ovary-bearing (female) organ of a flower.

Pistillate flower: a unisexual (female) flower bearing only pistils.

Pith: soft and spongy, or chambered tissue found in the middle of the stem.

Polygamo-dioecious: having unisexual flowers with staminate (male) and pistillate (female) flowers borne on different trees, but also having some perfect flowers on each tree.

Polygamo-monoecious: having unisexual flowers with staminate (male) and pistillate (female) flowers borne on the same tree, along with some perfect flowers on each tree.

Polygamous: Having some unisexual flowers and some bisexual flowers on each plant (can be polygamo-monoecious or polygamo-dioecious).

Pome: fruit with a fleshy outer coat and a stony layer (similar to plastic) within, with seeds inside the stony layer (apples, pears, etc.).

Pubescent: covered with hairs.

Rachis: the central stalk to which leaflets of a compound leaf are attached.

Radial-section: surface or section of a tree shown when wood is cut down its length straight through the middle.

Rays: ribbon-like groups of vessels, tracheids and fibers that move water and other substances in the xylem between the inner and outer rings and the phloem; best seen in radial sections of the trunk.

Rhombic: with an outline resembling a rhombus (diamond-shaped).

Ring-porous: type of hardwood in which the vessels in spring-wood are much larger than vessels in summer-wood (oaks, ashes, elms etc.).

Samara: dry fruit with one or two flat wings attached to a seed (as on elms and maples).

Sapwood: living wood, often light colored, found between the bark or cambium and the heartwood, usually darker colored.

Scale-like leaves: small, short, fish-scale-like leaves which cover the entire twig; found on juniper and redcedar.

Scientific names: Latin-based names used world-wide to standardize names of trees and other plants and animals.

Semi-ring-porous: type of hardwood in which the vessels in the spring-wood are somewhat larger than vessels in summer-wood; between diffuse-porous and ring-porous (black cherry, black walnut, etc.).

Serrate: with teeth.

Shade intolerant: trees that need a lot of sunlight for growth and survival.

Shade tolerant: trees that can tolerate less sunlight for growth and survival.

Shrub: low-growing woody plant with many stems rather than one trunk.

Simple leaves: leaves with one blade attached to a petiole, or stalk.

Sinus: a recess between two lobes.

Softwoods: usually refers to trees that are conifers or cone-bearing; conifers generally have softer wood than angiosperms or hardwoods, but there are many exceptions.

Solid pith: pith that is not divided into chambers.

Species: trees with similar characteristics and that are closely related to each other; species is used in both the singular and plural sense (specie is not proper).

Spring-wood: wood on the inside of an annual ring, formed during the spring; cells are often thinner-walled.

Stamen: the pollen-bearing (male) organ of a flower.

Staminate flower: a unisexual (male) flower bearing only stamens.

Strobile: a cone or inflorescence with overlapping bracts or scales.

Summer-wood: wood on the outside of an annual ring, formed during the summer; this wood is sometimes dark and cells are often thicker-walled.

Tangential-section: surface or section of a tree shown by cutting a tree lengthwise, but not through the middle.

Terminal buds: bud appearing at the apex, or end, of a twig; usually larger than other lateral buds.

Toothed/serrated margin: leaf margin with coarse, fine, sharp or blunt teeth.

Tracheids: small-diameter tubes in the wood of trees that carry water from the roots to the leaves; water carrying tubes in conifer xylem are all tracheids.

Tree: a woody plant with one to a few main stems and many branches; usually over 10 feet tall.

Unisexual flower: an imperfect flower; a flower with organs of only one sex present.

Vessels: large-diameter tubes in the wood of hard wood, or angiosperm, trees that carry water from the roots to the trees.

Xylem: the wood of a tree, made up of strong fibers, tracheids and vessels.

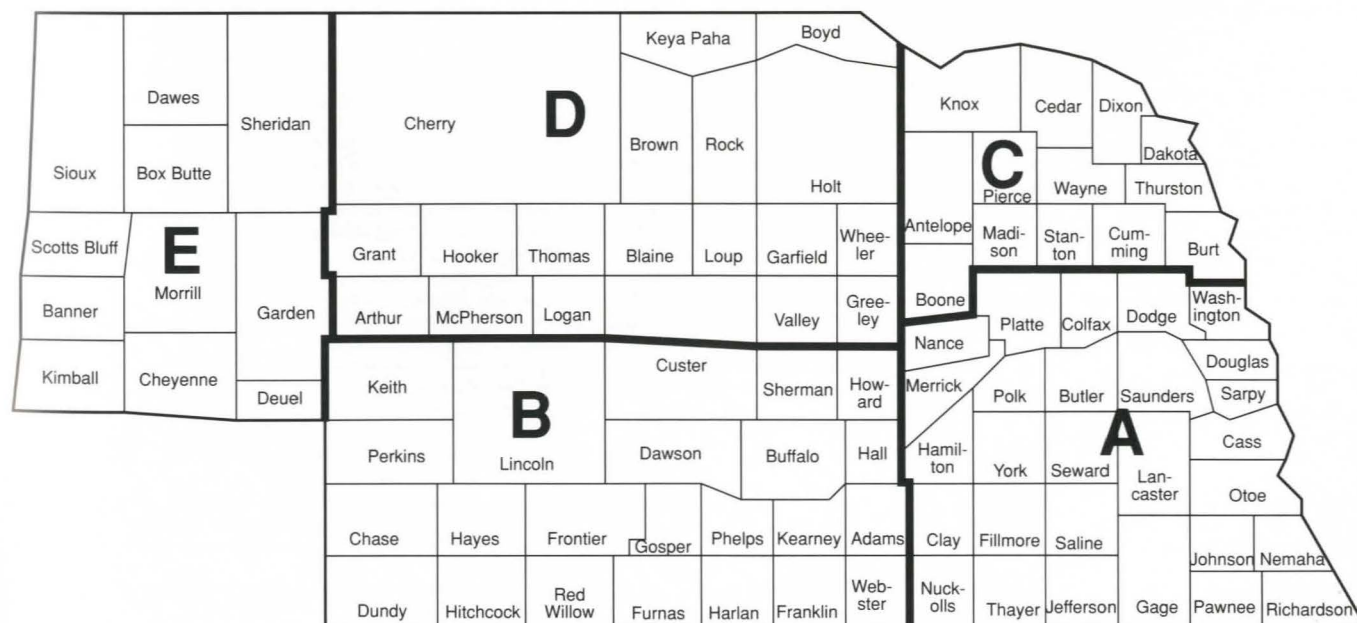
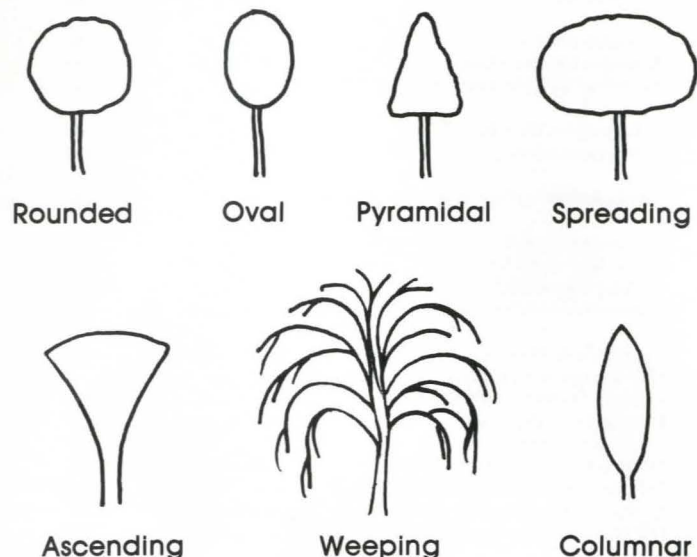


Landscape Characteristics for Selected Trees

The following list includes all of the species included in this book that are typically found in landscape plantings in Nebraska, including several that are often planted but should be used less. There are many species that are not included in this manual but are worthy of consideration. Some of the listed trees will not survive on sites where extremes in temperature, moisture, or wind are found. Such trees will need extra care to be used successfully as landscape trees.

This list is divided into three categories: large deciduous trees (over 35' tall at maturity), small deciduous trees (less than 35' tall at maturity), and evergreen trees. No shrubs are included. Crown habit refers to the general shape of the mature tree's crown (see diagram at right). Crown diameter provides an estimate of the approximate crown width for the mature tree. These figures are averages of actual trees measured on good sites in Nebraska. The primary use or uses of a tree in the landscape is denoted with the following letters: **B**arrier (barriers and windbreaks), **F**ruit, **L**andscape (general landscape use away from streets), **M**ultiple (good for many uses), **P**ark (good in parks and dispersed-use areas), **S**treet (suitable for street-side planting), and **W**ildlife (good for wildlife).

Planting zones are listed for each species that correspond to the map below. It may occasionally be worth trying a species in zones adjacent to its recommended zones, but only on protected sites. These zones are approximate and will be adjusted in the future as new species data is available.



Scientific Name (Common Name)	Crown Habit	Crown Diam. (ft.)	Primary Use	Zone	Remarks
Large Deciduous Trees (more than 35' tall at maturity)					
<i>Acer negundo</i> (boxelder)	Irregular	45'	P,W	All	Native tree found along streams; susceptible to storm damage.
<i>Acer platanoides</i> (Norway maple)	Rounded	40'	L	All	Good shade tree; scorches easily; "Emerald Luster", "Emerald Queen", "Erectum" (columnar), "Schwedleri" (purple leaves).
<i>Acer rubrum</i> (red maple)	Spreading	35'	L	A,C	Good fall color; protected sites, sunscald a problem; "Armstrong" (ascending), "Northwood", "Red Sunset".
<i>Acer saccharinum</i> (silver maple)	Spreading	70'	P	All	Overplanted; use other maples.
<i>Acer saccharum</i> (sugar maple)	Rounded	40'	L,S	A,C	Good fall color; protected sites; avoid clay soils; "Bonfire" (ascending), "Green Mountain".
<i>Aesculus glabra</i> (Ohio buckeye)	Rounded	30'	L,S	All	White flowers in spring; large fruit.
<i>Aesculus hippocastanum</i> (horsechestnut)	Rounded	40'	L,S	All	Dark green foliage; large fruit.
<i>Ailanthus altissima</i> (tree-of-heaven)	Spreading	35'	P	All	Very tolerant of pollution and poor soil conditions; branches weak; should not be planted in most circumstances.
<i>Betula nigra</i> (river birch)	Spreading	30'	L	All	Excellent tree; lower branches weep.
<i>Betula papyrifera</i> (paper birch)	Spreading	40'	L	All	White bark; borers a serious problem; better in western Nebraska.
<i>Betula pendula</i> (European white birch)	Weeping	30'	L	B,D,E	Attractive weeping habit; white bark; chlorosis can be a problem.
<i>Carya cordiformis</i> (bitternut hickory)	Ascending	40'	L,W	A	Needs some protection; fastest growing hickory.
<i>Carya illinoensis</i> (pecan)	Oval	30'	L,F	A	Use tested cultivars; "hican" is a cross with hickory.
<i>Carya ovata</i> (shagbark hickory)	Oval	30'	L,S	A	Edible nut; protected site; peeling bark.
<i>Castanea dentata</i> (American chestnut)	Spreading	45'	L,S	A,B	Chestnut blight a serious problem but isolated trees can survive.
<i>Castanea mollissima</i> (Chinese chestnut)	Rounded	35'	L,S	A	Delicious nuts.
<i>Catalpa speciosa</i> (northern catalpa)	Irregular	40'	P,S	All	Profuse white flowers; coarse tree; weak branches; large pods.
<i>Celtis occidentalis</i> (hackberry)	Spreading	55'	L,S	All	Excellent for difficult sites; sensitive to herbicides.
<i>Diospyros virginiana</i> (common persimmon)	Oval	30'	L,F	A,B,C	Edible fruit; protected sites.
<i>Fraxinus americana</i> (white ash)	Spreading	45'	L,S	A,B,C	Good purple fall color; "Autumn Purple".
<i>Fraxinus pennsylvanica</i> (green ash)	Spreading	45'	M,S	All	Tough native tree; avoid heavy clay; "Patmore" (seedless).
<i>Ginkgo biloba</i> (ginkgo)	Spreading	45'	L,S	All	Very pest resistant; plant male trees only; "Sentry" (columnar).
<i>Gleditsia triacanthos</i> (honeylocust)	Spreading	55'	M,S	All	Insect resistant; adaptable; seedless, thornless varieties available; "Green Glory", "Imperial", "Shademaster", "Skyline" (compact crown).
<i>Gymnocladus dioica</i> (Kentucky coffeetree)	Spreading	55'	L,S	All	Good native tree; large seed pods; pest resistant; good fall color.
<i>Juglans nigra</i> (black walnut)	Spreading	55'	P,W	A,B,C	Prefers rich, loamy soil; good wildlife tree; delicious nuts.
<i>Larix decidua</i> (European larch)	Pyramidal	40'	L	A,B,C	Deciduous conifer; beautiful foliage and yellow fall color.
<i>Larix laricina</i> (tamarack)	Pyramidal	40'	L	A	Deciduous conifer; excellent yellow fall color; also called eastern larch.
<i>Liquidambar styraciflua</i> (sweetgum)	Pyramidal	40'	L,S	A	Beautiful fall color; unusual fruit; dieback in severe winters; "Moraine" (hardy northern source).
<i>Liriodendron tulipifera</i> (yellow-poplar)	Oval	50'	L	A	Tulip-like flower in spring.
<i>Maclura pomifera</i> (Osage-orange)	Spreading	35'	B,P,W	A,B	Spines on twigs; large fruit; limited urban use.
<i>Magnolia acuminata</i> (cucumber tree)	Rounded	40'	L	A	Unusual in Nebraska; pale green flowers in spring.
<i>Morus alba</i> (white mulberry)	Spreading	45'	W,P	All	Birds love fruit; limited use recommended.
<i>Morus rubra</i> (red mulberry)	Spreading	45'	W,P	All	Native mulberry; limited use recommended.
<i>Platanus occidentalis</i> (American sycamore)	Spreading	60'	M,S	All	Unusual bark; anthracnose is a problem.
<i>Platanus x acerifolia</i> (London planetree)	Spreading	55'	L,S	A,B,C	Large spreading tree; attractive winter bark; "Bloodgood".
<i>Populus alba</i> (white poplar)	Spreading	60'	P	All	Fast growing; white bark; sprouts from roots.
<i>Populus deltoides</i> (eastern cottonwood)	Spreading	60'	P	All	Very large native tree; "Platte", "Mighty Mo", and "Ohio Red" are seedless and canker resistant; avoid "Siouxland" and "Noreaster".
<i>Populus nigra</i> var. <i>italica</i> (Lombardy poplar)	Columnar	10'	W,L	All	Grows quickly but dies of canker within 10 years; do not plant.
<i>Populus tremuloides</i> (quaking aspen)	Rounded	30'	L	All	Leaves flutter in wind; golden fall color; relatively short-lived.
<i>Prunus serotina</i> (black cherry)	Oval	45'	L,W	A,B,C	Birds like fruit; attractive flowers in spring.
<i>Quercus alba</i> (white oak)	Spreading	50'	L,S	A	Slow growth; very long-lived (100+ years).
<i>Quercus bicolor</i> (swamp white oak)	Ascending	50'	L,S	A	Excellent tree; good on compacted or poorly-drained sites.
<i>Quercus coccinea</i> (scarlet oak)	Ascending	40'	L,S	A,B	Good fall color; avoid alkaline soils.
<i>Quercus imbricaria</i> (shingle oak)	Pyramidal	40'	L,S	A,B	May dieback in winter.
<i>Quercus macrocarpa</i> (bur oak)	Spreading	70'	M,S	All	Very large; native species; strong branches; very desirable.
<i>Quercus muehlenbergii</i> (chinkapin oak)	Spreading	55'	M,S	A,B,C	Large and spreading when older.
<i>Quercus palustris</i> (pin oak)	Pyramidal	35'	L,S	A,B,C	Grows fast; chlorosis problems; plant on undisturbed, acid soils.
<i>Quercus robur</i> (English oak)	Rounded	30'	L	A,B	Small leaves; some winter damage; "Fastigiata" (columnar).
<i>Quercus rubra</i> (northern red oak)	Spreading	75'	M,S	All	Excellent fall color; pest and chlorosis resistant.
<i>Quercus velutina</i> (black oak)	Rounded	50'	L,S	A,B,C	Similar to <i>Q. rubra</i> ; prefers rich, well-drained soils.
<i>Robinia pseudoacacia</i> (black locust)	Spreading	35'	P,B	A,C	Small spines; fragrant flowers; borers can be a problem.
<i>Salix babylonica</i> (weeping willow)	Weeping	40'	P,L	All	Graceful, weeping habit; yellowish twigs; branches break easily.
<i>Taxodium distichum</i> (baldcypress)	Pyramidal	40'	L	A,B	Deciduous conifer; good on compacted sites; avoid basic soils.
<i>Tilia americana</i> (American basswood)	Spreading	65'	M,S	All	Fragrant flowers in early summer; good shade or street tree.
<i>Tilia cordata</i> (littleleaf European linden)	Rounded	40'	L	All	Small leaves; formal shape; pest resistant; "Greenspire" (pyramidal).
<i>Ulmus americana</i> (American elm)	Spreading	60'	L,S	All	Dutch elm disease a serious problem; "Liberty" (disease resistant).

Scientific Name (Common Name)	Crown Habit	Crown Diam. (ft.)	Primary Use	Zone	Remarks
Large Deciduous Trees (more than 35' tall at maturity)					
<i>Ulmus parvifolia</i> (Chinese elm)	Spreading	50'	L,S	A	Unusual lacy bark; can winter-kill; good shade tree.
<i>Ulmus pumila</i> (Siberian elm)	Spreading	60'	S	All	Good for difficult sites; weak branches; elm leaf beetle a problem; over-planted in the past.
<i>Ulmus rubra</i> (slippery elm)	Spreading	50'	P	A,C	Related to American elm; may be hard to find.
Small Deciduous Trees (less than 35' tall at maturity)					
<i>Acer ginnala</i> (Amur maple)	Spreading	20'	L,G	All	Outstanding red fall color; good on difficult sites; "Flame".
<i>Amelanchier arborea</i> (downy serviceberry)	Rounded	20'	L	A,C	Good in naturalistic planting; nice white flowers early in spring.
<i>Asimina triloba</i> (pawpaw)	Spreading	15'	L,W	A	Interesting tree; banana-like fruit; purple flowers; "Sunflower".
<i>Betula occidentalis</i> (water birch)	Spreading	20'	L	All	Small, shrubby tree with reddish-brown bark; spreading and pendulous branches; worth trying, especially in west, but hard to find.
<i>Cercis canadensis</i> (eastern redbud)	Spreading	25'	L	All	Beautiful purple flowers in early spring; shade tolerant.
<i>Cornus florida</i> (flowering dogwood)	Spreading	10'	L	A	Must have protection; shade tolerant.
<i>Crataegus crusgalli</i> (cockspur hawthorn)	Rounded	20'	L	All	White flowers; good on difficult sites; thornless variety available.
<i>Crataegus laevigata</i> (English hawthorn)	Rounded	20'	L	All	Good screen and border plant; fruit persists into winter.
<i>Crataegus phaenopyrum</i> (Washington hawthorn)	Rounded	25'	L	All	Dense crown with thorns; good flowers and showy fruit.
<i>Elaeagnus angustifolia</i> (Russian-olive)	Spreading	25'	W	All	Good living barrier, though canker is a problem.
<i>Juglans regia</i> (English walnut)	Rounded	30'	L,F	A,C	Good nut tree; can winter-kill in extreme winters.
<i>Koeleruteria paniculata</i> (goldenraintree)	Rounded	30'	L	A,B,C	Beautiful yellow flowers in late May, attractive pods afterward.
<i>Magnolia x soulangeana</i> (saucer magnolia)	Spreading	20'	L	A,B,C	Large, early, white to pink-purple flowers; smooth gray bark.
<i>Malus species</i> (crabapples)	Rounded	5-25'	L,S	All	Flowers white to red; good varieties include "Adams", "Indian Magic", "Liset", "Mary Potter", "Midwest", "Pinkspires", "Red Jade", "Red Snow", "Royalty", "Sargent", "Selkirk", "Snowdrift", "Spring Snow", "Sugar Tyme", "Tina", "Velvet Pillar", "White Candle", "Zumi".
<i>Ostrya virginiana</i> (eastern hophornbeam)	Spreading	15'	L	A,B,C	Does well in tight spaces and on tough sites; plant in groups.
<i>Phellodendron amurense</i> (Amur corktree)	Spreading	30'	L	A,C	Nice specimen tree; unusual bark.
<i>Pyrus calleryana</i> (callery pear)	Pyramidal	30'	M	All	Early white flowers; good fall color; "Aristocrat", "Bradford" (winter-kills and narrow branch angles), "Chanticleer", "Redspire".
<i>Sophora japonica</i> (Japanese pagodatree)	Spreading	35'	L	All	Creamy white flowers in mid-summer; some dieback in severe winters.
<i>Sorbus aucuparia</i> (European mountain-ash)	Spreading	30'	L	B,D,E	Bright orange fruit; prefers moist sites and does better in western Nebraska; American mountain-ash is similar.
<i>Syringa reticulata</i> (Japanese tree lilac)	Rounded	15'	L	All	White flowers in June; plant in groups as a screen.
Evergreen Trees					
<i>Abies balsamea</i> (balsam fir)	Pyramidal	25'	L	A,B,C	Beautiful blue-green color; plant in groups on protected sites.
<i>Abies concolor</i> (white or concolor fir)	Pyramidal	35'	L	All	Silver-green color; protected sites; plant in groups.
<i>Juniperus scopulorum</i> (Rocky Mountain juniper)	Pyramidal	15'	W,L	B,D,E	Blue-green foliage; does better in western Nebraska.
<i>Juniperus virginiana</i> (eastern redcedar)	Pyramidal	20-35'	W,L	All	Good, tough tree; "Canaert Juniper" (compact crown and profuse berries).
<i>Picea abies</i> (Norway spruce)	Pyramidal	40'	L	All	Very stately; pendulous branches; fast growing.
<i>Picea glauca</i> (white spruce)	Pyramidal	3-25'	L	All	More upright than Norway spruce with short needles; also called Black Hills spruce; "Dwarf Alberta" (dwarf—10' in 30 years).
<i>Picea pungens</i> (blue spruce)	Pyramidal	30'	L	All	Color from green to silver-blue; slow-growing; also called Colorado spruce.
<i>Pinus banksiana</i> (jack pine)	Pyramidal	25'	L	All	Often scrubby in appearance; good on dry, sandy sites.
<i>Pinus flexilis</i> (limber pine)	Pyramidal	25'	L	All	Nice specimen tree but tough to grow.
<i>Pinus nigra</i> (Austrian pine)	Pyramidal	35'	L	All	Stout needles; susceptible to needle and tip blights.
<i>Pinus ponderosa</i> (ponderosa pine)	Pyramidal	35'	L	All	Long needles; more disease resistant than Austrian pine.
<i>Pinus strobus</i> (eastern white pine)	Pyramidal	40'	L	All	Soft foliage; avoid open sites; beautiful tree.
<i>Pinus sylvestris</i> (Scotch pine)	Pyramidal	40'	L	All	Orange bark on upper trunk; small cones; attractive crown.
<i>Pseudotsuga menziesii</i> (Douglas-fir)	Pyramidal	35'	L	All	Nice bluish color; unusual cones; graceful habit; not a true fir.
<i>Thuja occidentalis</i> (northern white-cedar)	Pyramidal	15'	L	All	Good as foundation planting; avoid hot, dry sites; also called eastern arborvitae; foliage in horizontally-flattened sprays; "Mission" (dark green foliage; also called "Techny").
<i>Thuja orientalis</i> (Oriental arborvitae)	Pyramidal	15'	L	A,C	Good as foundation planting; needs protection; foliage in vertically-flattened sprays.

L= Landscape
S= Street
G= Group
P= Park
W= Wildlife
B= Barrier (thorny)
F= Fruit
M= Multipurpose



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